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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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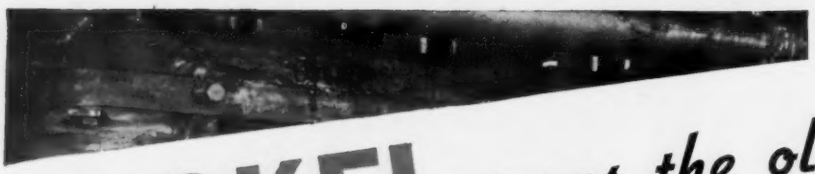
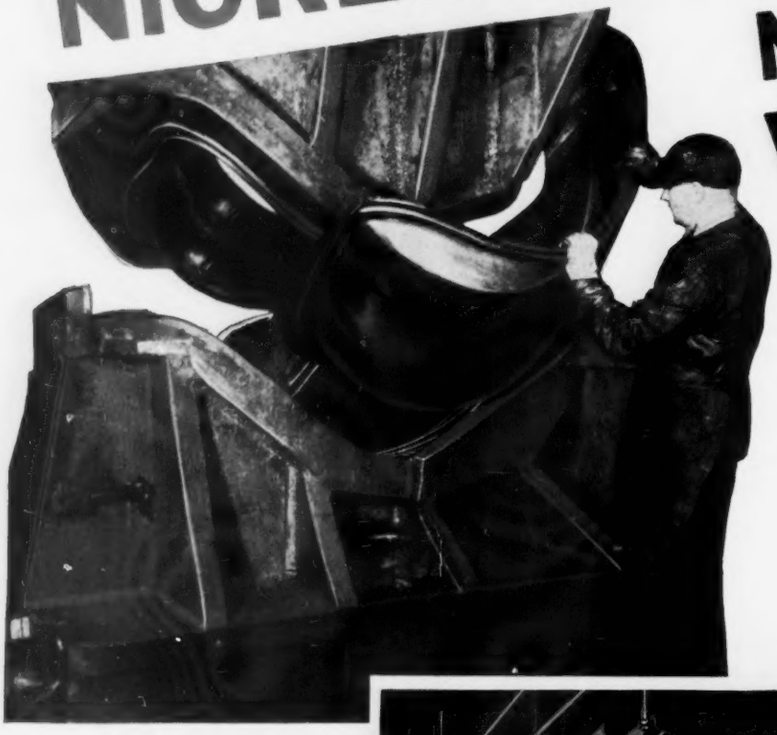
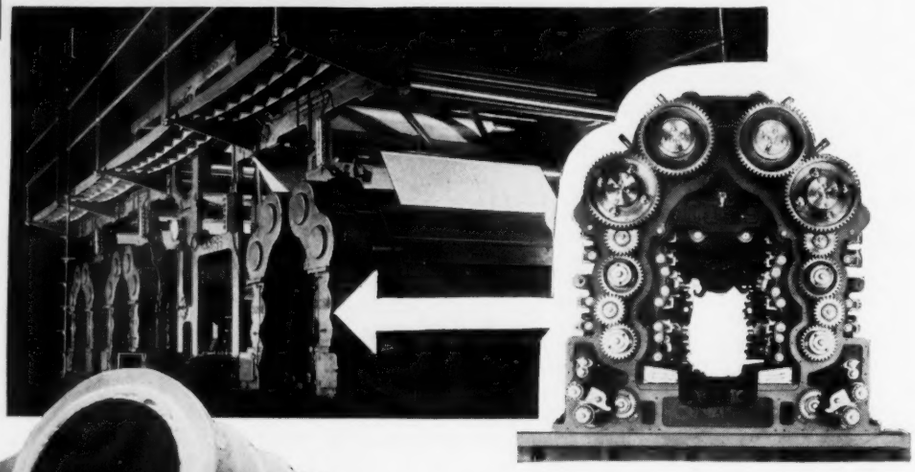
PRODUCTION · PROCESSING · DISTRIBUTION · USE



NICKEL *turns the oldest metals to* NEW and WIDER USES



Among the metals whose commercial use dates back for centuries is cast iron . . . a material that has always been highly respected for its adaptability, machinability and low cost. Times have changed . . . so has cast iron — thanks to scientific foundry practice and the intelligent use of alloying elements — principally Nickel. Considerably stronger, harder and more wear-resistant than the unalloyed product, Nickel Cast Iron is economical for many modern applications. For example, the Nickel cast iron fender forming die pictured here is capable of stamping out more than 30,000 automobile fenders without redressing. This performance is 3 to 6 times greater than is possible with plain grey iron and results in fewer interruptions of the production schedule for regrinding operations as well as appreciable reductions in maintenance costs.



Here is a modern newspaper press manufactured by Goss of Chicago in which all the gears are made of Nickel Cast Iron. In selecting this material for this application, Goss engineers were able to take advantage of the initial economy of cast iron. In addition, they obtained gears capable of withstanding the stress and wear of high speed operation — thanks to Nickel.

NICKEL CAST IRONS

Modern railroads cannot tolerate excessive locomotive failures. For instance, in cylinders, due to the trend towards greater tractive effort at high speeds, higher boiler pressures and superheated steam with its increased cylinder temperatures, strength, density and pressure tightness are the prime requisites. That is why railroads are turning more and more to Nickel Cast Iron for this purpose and various other applications demanding these all-important properties.

Our casting specialists will be glad to consult with you and suggest where the Nickel Cast Irons will effect economies in your plant or equipment.

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STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ MORE than a feeling of Christmas cheer pervades industry as 1938 draws to a close. Continuation of the strong upward trend of business during the past six months (p. 15) seems virtually assured for the next few months, although at a slower pace than hitherto. Under the impact of the holidays, steel production last week declined six points to 52 per cent of ingot capacity (p. 17) but the early days of the new year will see a rebound. Seasonal interruption usual at this time of year is mild. STEEL's index of industrial activity (p. 29) stands at 99.8 per cent, a drop of only 0.9 points from the level of the week previous. . . . The background which Harry L. Hopkins (p. 21) brings to his new office of secretary of commerce, is a lifetime spent in social service work.

. . .

Something new took place last week in the field of industrial relations. Employes of the Morgan Construction Co., Worcester, Mass., tendered a banquet to the company's directors (p. 14) and tendered them a scroll in commemoration of a half-century of harmonious relations. . . . Last week the results of the WPA survey (p. 17) of the steel industry's finances were released. It is intended to augment the securities and exchange commission's information for investors. . . . Protestors against the contemplated minimum wages in the iron and steel industry, 62½ cents an hour in the North and 45 cents in the South, last week held (p. 15) that the secretary of labor has no legal authority for fixing wages by this broad classification.

Workers Fete Directors

A subject that undoubtedly will come up at the next session of congress (p. 21) is an incentive plan of taxation designed to regularize and encourage employment and promote profit sharing systems. Viewpoints on this plan differ widely. . . . The automobile industry (p. 25) continues to explore possibilities for ironing peaks and valleys out of its production curve. Seasonal variations in discounts to dealers are seen in some quarters as a possible means toward that end. . . . Hobby lobbies of late have won a recognized place in the industrial relations of a number of companies. One such occasion last week revealed (p. 20) that outside interests of workers cover an exceedingly wide range. . . . Airplane industry will enter 1939 (p. 20) with a $150,000,000 order book.

Big Backlog For Aircraft

. . .

More employers today recognize that the employe's basic desire is for steady employment so as to assure uniform pay. A large soap manufacturer, as a result of a complete change in its general sales policy, has been able (p. 32) to effect such a plan. This manufacturer holds that any company that can forecast the consumption line for its product within 10 per cent can work out the details of a plan of steady employment, although plans must vary with individual conditions. He believes the wages-hours law, unless amended to grant exemptions to companies with uniform production plans, can deal a telling blow to the movement for steady employment. If management does not provide steady employment, he believes, the matter will be taken out of its hands.

Stabilizing Employment

. . .

Some users obtain phenomenal life from industrial electric motors; one authority discloses (p. 36) the simple methods that permit this result. . . . A manufacturing building of unique design was constructed recently (p. 34) at one-third usual cost. . . . A producer of bus bodies (p. 48) has halved costs by using a highly developed all-welded procedure. . . . Three-dimensional photoelasticity is a new method for predetermining stress and strain (p. 50) on complex structures. . . . Bulges in steel plates after welding or torch cutting may be eliminated (p. 41) by subsequent application of the oxyacetylene flame. . . . A malleable foundry (p. 42) enjoys savings from battery operated trucks. . . . A company making many dissimilar products (p. 46) derives economies from a new flexible heat treating department.

Cutting Costs

E. L. Shaner

But Only One Will Cut Your Costs

The forming operations that can be regularly and satisfactorily performed on galvanized sheets have been greatly extended by Inland's new galvanizing department, re-equipped for more modern service. Modern controls in every department permit us to go further in producing base sheets and coatings to suit special requirements. As a result, flaking and other common production problems usually can be minimized. Your nearest Inland office will help you determine the specifications that will cut your costs.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Strong Rise in Steel for 1939 Indicated

By Precedent and Pent-Up Demand

■ IN THE standing of steel production the past ten years, 1938 ranks as a second-division contender. The estimated 28,000,000 tons of ingots produced this year has been exceeded five times since 1928.

Nevertheless, 1938 did well to climb to sixth place. At the end of June it was a poor eighth, struggling to keep ahead of 1932 and 1933. A strong second-half rally, however, pushed it well ahead of not only those years, but 1931 and 1934 as well. This rapid comeback augurs well for 1939.

The ten-year standing:

	Tons
1929	54,312,279
1937	49,502,907
1936	46,807,780
1930	39,286,287
1935	33,417,985
1938	**28,000,000**
1934	25,599,118
1931	25,192,715
1933	22,594,079
1932	13,322,833

Rarely has the steel industry displayed such strong recuperative power as was manifested the past six months. Operations in July, poorest month of the second half, were almost as good as in March, best month of the first period. Between June and November steelmaking more than doubled, while total output for the latter half was nearly 60 per cent ahead of the first six months.

While 1938 as a whole was 43.5 per cent behind 1937, the third and fourth quarters were only about 17 per cent below the corresponding period last year. The abrupt collapse of business the last three months of 1937 partly accounts for the relatively good showing lately and for the definitely more favorable auspices, as compared with a year ago, under which 1938 is closing.

Steel Gains Assured for 1939

What of 1939? Seemingly, the forecaster is taking few chances in predicting a better year industrially for the coming 12 months. An increase in steel output appears virtually assured—and not solely because of the depths to which activity descended the first half this year. The second-half recovery provides the more important clue to what may be looked for in 1939.

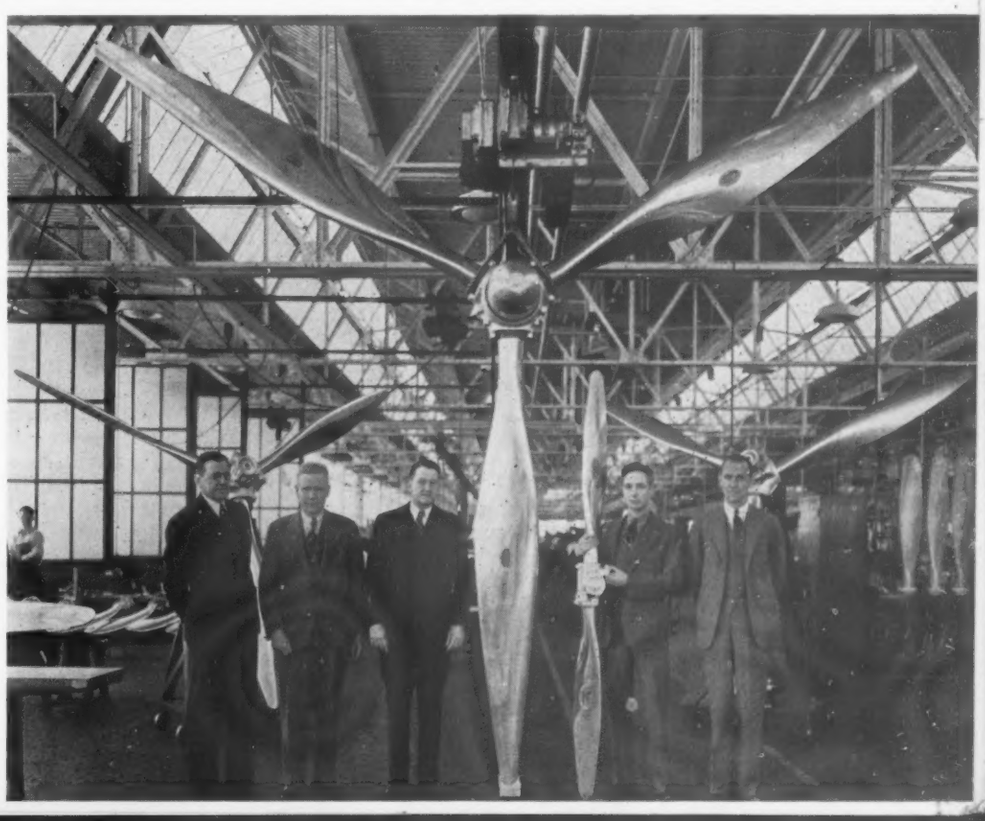
A study of steelmaking trends since 1918 reveals that the performance of the second half dictates whether an increase or decrease will be recorded in production the succeeding year. Recovery or relapse in business invariably has made its first appearance after June.

For example, steelmaking tended downward after June of 1929, 1930 and 1931, forecasting receding output for 1930, 1931 and 1932. A slight recovery occurred the second half of 1932, and although interrupted by the banking moratorium of March, 1933, this latter year scored a substantial gain in total production.

Expansion in steel ingot output in 1922, 1925, 1926, 1936 and 1937 in each instance was heralded by

✦

17-Foot Metal Airplane Propeller, Largest Ever Built



■ Hamilton Standard Propellers division, United Aircraft Corp., East Hartford, Conn., has just completed this 17-foot hydromatic propeller, largest metal propeller ever built. It is designed for use on airplanes that still are on the drafting boards, and that will be larger than any now in service. Maximum horsepower of airplane engines now is reported to be 1500. The propeller dwarfs the 11½-foot three-bladed units also shown in the picture, the size used on Douglas DC-3 transports flying major air lines in this country. Largest propellers previously built by Hamilton Standard are the 14-footers now on the big Boeing 314 flying boat and the Douglas DC-4.

an unmistakable quickening in activity the second half of the preceding year. Similarly, the poor record of 1938 as a whole was indicated by the decline in the fourth quarter of 1937.

It is not to be inferred that the year tagged for rising business necessarily will display this tendency throughout its 12 months. It may suffer a reversal after six months or more—thereby pointing to less satisfactory conditions the following year—but the gains of early months always have been sufficient to score improvement for the entire year.

For 1939 it is logical to expect the first half to show a sizable increase over the corresponding 1938 period, with the margin narrowed the remaining six months.

The initial impetus of the rebound already has been dissipated. Subsequently recovery will be slower. Recent tapering in steelmaking, while largely seasonal, is not unlikely to be followed by a period of hesitation the fore part of next quarter.

Outlook Fair to Good

What increase in tonnage may be expected for 1939? In the absence of any accurate formula for determining the probable rise, the evaluation must be made on an appraisal of prospects for leading consumers of steel. Among the major users the outlook varies from fair to good.

Automobile manufacturers, it is estimated, will build 30 to 35 per cent more cars and trucks next year than in 1938. This would be about 3,500,000 units. Some observers look for a 4,000,000-car year, but the lower figure is a more average guess.

Building is counted on to continue the rising trend of the past several years, although government spending will be a less potent factor as 1939 progresses. A 20 per cent increase over 1938 is a general forecast for next year.

Railroads recently have shown a moderate revival in buying of track material and equipment, although it is partly seasonal. This betterment will continue, however, provided traffic and revenue remain on the upgrade, because the roads need rails, cars and locomotives. Federal legislation proposed for action by congress may be an important factor in stimulating such purchases.

The carriers slashed their orders for materials and equipment more than 50 per cent this year. A 25 per cent increase for 1939 appears conservative; it may be substantially more if easy credit becomes available, if income extends recent gains sufficiently and if congress lends a sympathetic ear to requests for changes in rate-making practices.

Tin plate, unhampered by heavy stocks of plate and canned goods that helped to reduce production about 45 per cent this year, should recover sharply in 1939. Inherently fast on the rebound, tin plate output next year is not unlikely to regain one-half the ground lost in 1938, or a 40 per cent rise.

No small number of more or less extraneous factors enter into a consideration of future business prospects. Such matters as European war threats, federal deficits and government policies, labor and excessive supplies of certain farm commodities—all may have a certain influence on the final 1939 results.

Industrial activity as a whole this year has been 20 to 25 per cent behind 1937. Some forecasts call for a 15 to 20 per cent recovery in 1939, placing the year at about the 1936 level. For steel production to match the 1936 figure would require a 65 per cent rise over 1938. Such an expectation appears overly-optimistic at this writing, although the pattern and total output of the second halves of 1935 and 1938 are almost identical.

With certain important steel consuming industries unlikely to regain their 1936 vigor by next year, however, an upturn of about 40 per cent to an aggregate of 40,000,000 tons currently seems a more probable development.

Carnegie Restores Full Pay for Full-Time Work

■ Effective Jan. 1, the full-time work week of Carnegie-Illinois Steel Corp.'s salaried employes will be on the basis of 5½ days, to which will apply the present base salary rates, which are on a 5½ day basis. The company says:

"Those whose work requires the full 5½ days will be paid on such base salary rate. Those whose work does not require the full 5½ days will be paid on the part-time basis.

"The return of the 5½ day base rates for salaried employes and the payment of the applicable base salary will result in restoring full-time pay for those salaried employes whose work requires the full 5½ days per week. In the case of the higher executives full time will not be restored at this time."

Morgan Employes Honor Directors at Banquet

■ Employes of Morgan Construction Co., Worcester, Mass., tendered a banquet Dec. 17 to directors of the company, to express their esteem. This also marked the fiftieth anniversary of the first Morgan continuous rolling mill built for the steel industry by Charles H. Morgan, founder.

Plans for the banquet sprang spontaneously from employes and 325 out of a possible 362 attended. They presented a hand-printed scroll to Paul B. Morgan, son of the founder and president, attesting "fifty years' progress in rolling mill engineering, honest and constructive business management, and liberal treatment and understanding relationship with their employes."

Although Mr. Morgan was the special guest of honor, others honored were Philip M. Morgan, treasurer and a director; John W. Shepherdson, James A. Buell, Myles Morgan, Ralph L. Morgan, directors.

A highlight was a surprise visit by Governor-elect Saltonstall and Mayor Bennett, both of whom spoke highly of the relationship existing between the workers and management.

Government Asks For Steel Data

■ DEPARTMENT of justice, Washington, is sending out for the national economic committee (monopoly investigation) the first of two questionnaires dealing with distribution and pricing of selected steel products.

Space is provided in the questionnaire for the name of the steel producer; location of each works or group of works from which shipments are reported; name of each product shipped from works during the period specified—that is, February, 1939; and the basing point on which the delivered price was computed.

An affidavit must be executed by the officer of the reporting company who is responsible for the questionnaire. It is explained that in the case of products which are quoted Gulf ports or Pacific coast ports, without price differential, Gulf ports or Pacific coast ports will be considered as a single basing point in each case, respectively.

Leaders To Broadcast 1939 Business Outlook

■ Executives representing nine leading American industries will forecast the business outlook for 1939 during a special year-end program over an NBC network Dec. 29.

Included are: T. M. Girdler, chairman, Republic Steel Corp. and president, American Iron and Steel institute; J. J. Pelley, president, Association of American Railroads; Alvan Macauley, president, Automobile Manufacturers' association; and Philip A. Benson, president, American Bankers' association.

Steel Producers, at Hearing, Protest Contracts Board's Wage Proposal

WASHINGTON

■ A TWO-DAY oral argument was held last week in Washington on the public contracts board's recommendations on minimum steel wages under the Walsh-Healey law, dealing with government contracts.

Charles V. McLaughlin, assistant secretary of labor, conducted the argument and indications are the decision will be made and signed by him. He said after the hearings that unless something unforeseen develops he expects to make a final finding within a few weeks.

At the opening of the arguments, Mr. McLaughlin said: "The hearing is being held before me as assistant secretary of labor with power to act for and instead of the secretary because the findings of the board as to the wage structure are unusually complete and because the objections to the board's report go not to the findings as to wages actually paid in the industry but to the recommendation based on these wage facts that the prevailing minimum wage be found to be 45 cents in the South and 62½ cents in the North."

Chester A. McLain represented Bethlehem Steel Co., and made a detailed statement on behalf of his company, pointing out where the company thought the board erred in its recommendations.

He stressed the wording of the Walsh-Healey act and contended that, according to the law itself, a prevailing minimum wage must exist at some time and in some place. He held that in many instances the board had set rates where there was no other similar rate either in the steel industry or any other industry in that particular locality which was anything like the minimum rate set by the board.

Mr. McLain related the history of the law and contended the act is not a price-fixing measure at all but a fact-finding act. The secretary of labor, he said, is not given the power to set wages in any industry and he insisted that the contracts board in its recommendations has entirely disregarded what it has authority to do under the law.

Says Act Improperly Applied

The company takes exception, Mr. McLain said, to both the minority and majority reports in their entirety on the ground the reports show the board has not properly applied the provisions of the public contracts act "to the facts as established by the evidence in the record and on the ground that, therefore, the findings of fact, conclusions and recommendations set forth in the report cannot constitute a proper basis on which the secretary of labor can make a proper determination of the prevailing minimum wages in the iron and steel industry."

Mr. McLain told the assistant secretary the provisions of the public contracts act with regard to the determination by the secretary of labor of prevailing minimum wages are clear and that they require that it shall be a determination of what the existing prevailing minimum wages are in the respective localities in which the industry's plants are located.

He said that even if there could be any question as to the proper interpretation of some provisions, the act's history shows clearly it was the intent of congress that it should be construed as to respective localities.

Counsel for Bethlehem said further the findings of fact, conclusions and recommendations of the majority of the board with regard to the prevailing minimum wages in the steel industry are contrary to the act's provisions and purposes, "because they fail to recognize the wage differentials that have long existed among different localities in which the plants of the industry are situated."

Mr. McLain contended also the evidence in the record shows existence of well defined and long established wage differentials among various localities and the majority of the board has erred in failing to make findings and recommendations which recognize such wage differentials."

It was argued also by Mr. McLain that further studies which were recommended by the board should not be deferred until after a wage determination shall be made, "but insofar as they may be proper, they should be completed before such determination shall be made."

Congressman Explains Intent

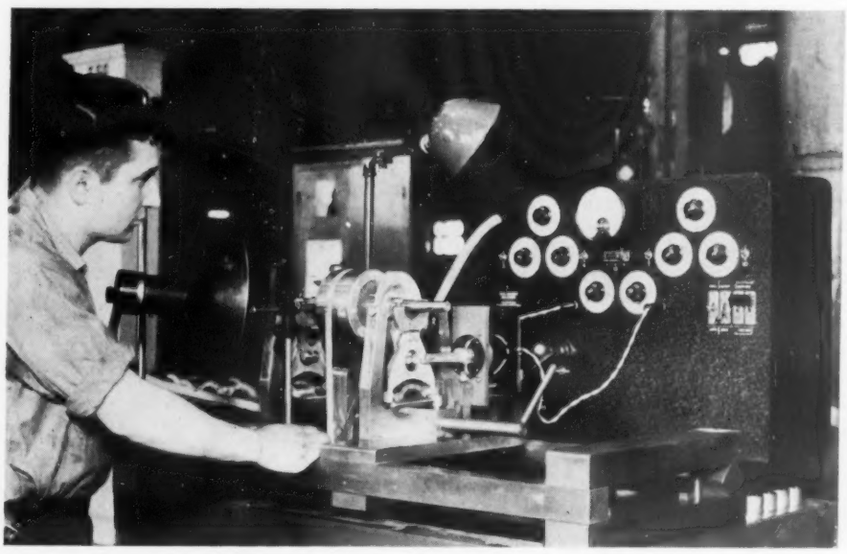
An interesting statement was made by Representative Walter of Pennsylvania, a member of the house judiciary committee which drafted the bill and a member of the subcommittee which had the bill directly in charge.

Mr. Walter explained the intention of congress in passing the Walsh-Healey law and said it was not intended the secretary of labor should fix wages. It was originally drafted to take care of the situation in the "sweated" industries, he said. He pointed out that congress intended minimum wages in the respective localities should be taken into consideration and expressed the opinion this had not been done in the steel study.

Representative Walter stated specifically his opinion the secretary of labor does not have authority under the act to fix wages. He said

(*Please turn to Page 22*)

Device Automatically Detects Unbalance in Rotors



■ **This electric dynamic-balancer automatically indicates both the amount and position of unbalance in any piece of rotating equipment, permits greater precision in high-production work. Westinghouse Electric & Mfg. Co. photo**

November Export Total Declines

■FOLLOWING the pattern set in 1935, and continued each year since, November exports of steel and iron products, scrap excluded, made a slight decline from October. November exports, other than scrap, totaled 196,156 gross tons, valued at $11,522,717. This was a decrease of 5321 tons from October, but gain of $58,826 in value. In November, 1937, exports were 301,280 tons, valued at $22,871,417, according to the metals and minerals division, commerce department.

Total exports for 11 months, 1,982,780 tons, assure a total for the year of more than 2,000,000 tons. In 11 months last year the total was 3,168,620 tons. Total value of 11 months' exports was $128,160,925, giving an average value of $64.636 per ton, compared with $63.79 average per ton for the $202,129,671 value in the 11 months of 1937.

Scrap exports in November totaled 450,001, more than double the 223,954 tons exported in October, and exceeding the 255,311 tons exported in November, 1937, by a wide margin. Japan took 319,943 tons, Italy 55,446 tons, and Germany 30,515 tons.

Scrap exports for 11 months totaled 2,856,393 tons, valued at $41,094,317. This compares with 3,772,819 tons valued at $73,503,647 in 11 months of 1937; and is about 75 per cent of the 1937 tonnage but only about 55 per cent of the value.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Nov. 1938	Oct. 1938	Jan. thru Nov. '38
Pig iron	38,383	61,339	412,229
Ferromanganese and spiegeleisen	8	6	241
Other ferroalloys	43	70	1,043
Ingots, blooms, etc.:			
Not containing alloy	3,101	5,980	149,733
Alloy incl. stainless	323	1	7,538
*Steel bars, cold fin.	693	335	12,244
Bars, iron	42	152	1,317
Bars, concrete	2,063	2,962	19,971
Other steel bars:			
Not containing alloy	8,215	8,196	98,301
Stainless steel	5	4	552
Alloy, not stainless	1,622	224	5,539
*Welding rods, electric	118	131	1,047
Wire rods	1,600	1,232	21,976
Boiler plate	103	328	6,392
Other plates not fab.:			
Not containing alloy	20,961	18,316	172,085
Stainless steel	8	9	260
Alloy, not stainless	784	175	2,976
Skelp iron or steel	24,706	13,817	52,247
Sheets, galv. iron	395	74	3,462
Sheets, galv. steel	5,910	7,148	64,990
Sheets, "black" steel:			
Not containing alloy	21,984	13,830	176,785
Stainless steel	60	99	1,621
Alloy, not stainless	34	498	3,214
Sheets, black iron	406	632	6,695
Strip steel, cold-rolled:			
Not containing alloy	2,116	1,588	22,428
Stainless steel	58	30	417
Alloy, not stainless	33	5	311
Strip steel, hot-rolled:			
Not containing alloy	3,638	4,464	32,361
Stainless steel	25	4	153
Alloy, not stainless	7	30	84
Tin plate, taggers' tin	10,908	12,330	146,491
Terne plate	341	214	4,090
Tanks, except lined	1,714	3,217	35,395
Shapes, not fab.	6,916	5,944	77,484
Shapes, fabricated	3,227	4,324	34,811
Plates, fabricated	77	915	21,658
Metal lath	60	28	782
Frames and sashes	171	99	1,301
Sheet piling	526	276	3,390
Rails, 60 lbs.	505	6,057	41,537
Rails, under 60 lbs.	105	90	4,274
Rails, relaying	3,739	17	31,813
Rail fastenings	564	264	6,943
Switches, frogs, crsgs.	92	183	1,600
Railroad spikes	223	171	2,391
R. R. bolts, nuts, etc.	150	198	1,088
Boiler tubes, seamless	425	580	10,437
Boiler tubes, welded	7	22	1,424
Pipe:			
S'ml's cas'g, oil-line	3,279	3,004	45,082
Do. welded	644	248	10,433
S'ml's black, ex. csg.	445	728	6,602
Pipe fittings:			
Mall. iron screwed	183	280	2,789
Cast iron screwed	155	191	1,753
Pipe and fittings for:			
Cast iron pressure	2,652	694	18,933
Cast iron soil	951	709	9,084
Pipe, welded:			
Black steel	821	1,175	9,733
Black wrought iron	137	194	2,832
Galvanized steel	1,540	1,360	12,495
Galv. wrought iron	307	102	2,128
Pipe and fittings:			
Riveted iron or steel	2	3	942
Wire:			
Plain iron or steel	2,163	2,618	21,939
Galvanized	3,718	2,506	23,317
Barbed	3,804	4,092	30,870
Woven wire fencing	150	325	1,960
Woven wire screen cloth:			
Insect	28	39	243
Other	82	85	979
Wire rope and cable	278	235	3,245
Wire strand	22	32	725
Card clothing	11	13	82
Other wire	818	428	5,441
Wire nails	2,122	2,040	18,121
Horseshoe nails	54	93	796
Tacks	21	36	239
Other nails, staples	467	351	3,907
Bolts, machine screws	665	674	7,308
Castings:			
Gray iron, semi-steel	474	305	3,583
Malleable iron	123	65	1,142
Steel, not alloy	74	78	1,229
Alloy, incl. stainless	225	60	900
Car wheels, tires, axles	1,872	1,235	20,340
Horseshoes and calks	2	39	100
Forgings, n.e.s.:			
Not containing alloy	492	382	7,448
Alloy, incl. stainless	181	450	939
Total	196,156	201,477	1,982,780
Scrap iron and steel	448,020	221,466	2,834,343
Scrap, tin plate	1,085	1,539	11,368
Tin plate circles, strips, cobbles, etc.	330	104	3,979
Waste-waste tin plate	566	845	6,703
Total scrap	450,001	223,954	2,856,393
GRAND TOTAL	646,157	425,431	4,839,173
Iron ore	33,389	98,466	561,849

*Not distinguished prior to 1938.

Industrial Machinery Exports Show Loss

■ United States exports of industrial machinery in November were 4 per cent less than those of the same month last year, $19,629,659 compared with $20,381,066, according to the machinery division, bureau of foreign and domestic commerce. For the third consecutive month the only advance is found in power-driven metalworking machinery. This class advanced 34 per cent to $8,044,476 from $5,988,511, almost all items in the group participating in the gain. Other metalworking machinery declined from $364,664 to $301,162, or 18 per cent.

Mining, well and pumping machinery sustained a loss of 8 per cent from last year, construction and conveying machinery 27 per cent, power generating machinery 22 per cent and textile machinery 32 per cent.

Yale & Towne Marks 70th Year

■ YALE & TOWNE MFG. CO., founded in December, 1868, by Henry R. Towne and Linus Yale Jr., to manufacture locks, held a two-day exhibition in the State armory, Stamford, Conn., Dec. 16-17, to mark its seventieth anniversary.

A large audience, including about 500 men employed by the company 25 years or more, heard talks by Mayor Charles E. Moore, Schuyler Merritt, former member of congress and oldest member of the board of the company in point of service, W. Gibson Carey Jr., president of the company, and Richard G. Plumley, works manager.

The company, since its humble beginning, when it employed only 40 in a small shop, has grown to be one of the largest manufacturers of locks, builders' hardware, electric hoists, industrial trucks, pumps, chain hoists and door closers. Besides its home plant, it has two in Chicago, one in Philadelphia, one in St. Catherines, Canada; one in Willenhall, England; one in Germany, and one in Branka, in territory recently taken by Germany from Czechoslovakia. At peak demand these plants employ close to 9000. There have been three presidents since the company was organized, Mr. Towne, Walter C. Allen and Mr. Carey.

In the exhibit were historical displays of the art of lockmaking from the days of the Pharaohs through the Roman and medieval periods. The displays have been prepared for the New York world's fair.

One of the demonstrations was a master-keyed house, showing how several locks, set to different keys, may be controlled by a master key.

Farm Tool Shipments Lower in November

■ Agricultural implement exports in November were valued at $4,165,238, compared with $4,567,815 in the corresponding month last year, a decline of 9 per cent, as reported by the machinery division, foreign and domestic commerce bureau.

Harvesting machinery was the only group showing an increase. Tillage implements experienced the largest drop, 39 per cent. Tractors and parts were 3 per cent less than a year ago. Miscellaneous items showed a 5 per cent decline.

As WPA Surveys Steel's Finances

■ COMBINED net profit of 10 steel companies, each having assets of more than $100,000,000 and aggregate assets of above $4,000,000,000, amounted to approximately $200,000,000 in 1937, according to a securities and exchange commission report. The 1937 earnings were about 7 per cent of sales and compared with $128,000,000 net or 5.7 per cent of sales in 1936.

Combined volume of business by the 10 companies totaled $2,848,000,000 in 1937, compared with $2,262,000,000 in 1936, $1,576,000,000 in 1935, and $1,215,000,000 in 1934.

Dividends paid in 1937 were $129,000,000 compared with $92,000,000 the year before, $20,000,000 in 1935, and $12,000,000 in 1934.

The information is contained in the first of a series of reports based on a census of American corporations by the works progress administration under SEC sponsorship.

Presents Factual Data

Factual data are presented for the individual and combined companies and are intended to bridge the gap between information available in SEC files and potential users. Included are a general survey, names of parent and subsidiary companies, outstanding security issues, 16 financial and operating ratios for each company, salary data, balance sheets, profit and loss statements, and surplus reconciliations. Future surveys will cover other industries.

Steel producers included in the study: American Rolling Mill Co., Bethlehem Steel Co., Crucible Steel Co. of America, Inland Steel Co., Jones & Laughlin Steel Corp., National Steel Corp., Republic Steel Corp., Wheeling Steel Corp., Youngstown Sheet & Tube Co., United States Steel Corp. Also listed in the report are Tennessee Coal, Iron & Railroad Co., United States Steel Corp. subsidiary, and the Illinois Steel Co., now part of Carnegie-Illinois Steel Corp., another U. S. Steel subsidiary.

Intimation of Hopkins' Appointment Confirmed

■ Confirming the earlier information concerning President Roosevelt's intention to appoint Harry L. Hopkins secretary of commerce—as reported in Windows of Washington, p. 21—the White House secretariat last Friday definitely announced the President would make the appointment, and that Hopkins would be sworn in Dec. 24.

Further, it was announced the President would designate Col. F. C. Harrington to succeed Hopkins as WPA administrator.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 24	Change	Same week 1937	Same week 1936
Pittsburgh	40	— 1	14	67
Chicago	56.5	— 3.5	23.5	64
Eastern Pa.	32	— 5	25	47.5
Youngstown	45	—11	18	68
Wheeling	59	— 3	19	88
Cleveland	50	— 9	24	68
Buffalo	44	None	14	47
Birmingham	71	—11	45	74
New England	70	None	28	77
Cincinnati	75	None	36	96
St. Louis	51.5	None	15	80
Detroit	90	+ 1	52	92
Average	52	— 6	23	68

MEETINGS

NATIONAL DEFENSE FEATURE OF S.A.E. ANNUAL MEETING

■ ANNUAL meeting of the Society of Automotive Engineers at the Book-Cadillac hotel, Detroit, Jan. 9-13, will devote technical sessions to problems in connection with aircraft, aircraft engines, transportation and maintenance, passenger cars and bodies, fuels and lubricants and diesel engines. A paper, "Welded Steel Cylinder Blocks," will be presented by Everett Chapman, president, Lukenweld Inc., Coatesville, Pa., at the passenger car engine session on Jan. 10.

The program for Jan. 11 will center on national defense. Principal speaker at the dinner on the evening of Jan. 11 will be Brig. Gen. C. T. Harris Jr., assistant to chief of ordnance, and his subject "Industrial Mobilization for National Defense."

DISTRIBUTION TOPIC FOR MARKETING GROUP MEETING

American Marketing association, holding its semiannual meeting at Hotel Statler, Detroit, Dec. 28-30, will devote sessions to the subjects of industrial marketing, recent contributions on prices and price policies, changing distribution channels, uses of statistics in the management of distributive businesses, and cost and marketing problems arising under recent price legislation.

Among papers to be presented are the following: "Place of Industrial Marketing in Distribution," by John H. Frederick, University of Texas; "Motivation and Practices in Purchase of Industrial Goods," by Delbert J. Duncan, Northwestern university; and "Marketing Research Activities of Manufacturers," by Miss Elma Moulton, bureau of foreign and domestic commerce.

PRODUCTION

■ STEELWORKS operations last week advanced in one district, declined in seven and held steady in four. The national rate is estimated at 52 per cent, 6 points lower than in the preceding week.

St. Louis—Unchanged at 51.5 per cent for the fourth week, the highest rate of the year. No stocks are being accumulated.

Central eastern seaboard—Down 5 points to 32 per cent, due mainly to a general shutdown Friday. Some producers will operate over the New Year weekend.

Birmingham, Ala. — Declined 11 points to 71 per cent because of Saturday holiday. Resumption Monday is scheduled for 82 per cent, with 18 open hearths active.

Youngstown, O.—Loss of 11 points to 45 per cent resulted from decreased bessemer production and shutdown of Brier Hill plant of Youngstown Sheet & Tube Co. The holiday is expected to cut this week's schedule to about 38 per cent.

Pittsburgh—Reduction of 1 point to 40 per cent indicates a slowing in the downward rate of the past five weeks.

Wheeling—Off 3 points to 59 per cent, first decline this month. Holiday interruptions caused the loss.

New England—Unchanged at 70 per cent with indications the same rate will hold this week.

Detroit—With all but two open hearths in production the operating rate rose 1 point to 90 per cent. Loss of a full day this week by one producer for Christmas will bring a slight recession.

Buffalo — Production last week held at 44 per cent. One interest added an open hearth as another was taken off for repairs.

Cincinnati—Continued at 75 per cent.

Chicago — Off 3.5 points to 56.5 per cent, still holding close to the highest rate of the year, 60 per cent.

Cleveland—Shutdowns for Christmas caused a drop of 9 points to 50 per cent.

Foundry Equipment Orders Make Slight Gain

■ Foundry equipment orders increased slightly in November, according to the Foundry Equipment Manufacturers' association, Cleveland. Indexes based on 1922-24 as 100 show the following comparisons:

	Nov., 1938	Oct., 1938	Nov., 1937
Net orders	89.7	87.9	128.03
Shipments	94.5	93.4	178.80
Unfilled orders	87.0	91.8	294.00
3 mos. av. gross orders	85.4	83.3	181.80

MEN OF INDUSTRY

■ HARRY M. FRANCIS has been appointed assistant vice president—sales, American Steel & Wire Co., Cleveland. He entered its employ as a messenger in the New York office in 1915, later becoming a salesman. After serving as assistant manager of sales, Philadelphia office, he returned to New York in 1925, and in 1927 was transferred to Boston as manager, manufacturers trade department. In 1934 he became New England district manager of sales, which position he retained until April, 1937, when he was transferred to Cleveland as assistant general manager of sales.

♦

C. A. Chestnut, vice president, McCord Radiator & Mfg. Co., Detroit, has also been made general manager of the company.

♦

R. J. Aitchison, president, Vascoloy-Ramet Corp. and Fansteel Metallurgical Corp., both of North Chicago, Ill., has been elected a director, Illinois Manufacturers association.

♦

Harry B. Reno Jr., manager of the Detroit branch of Edgar T. Ward's Sons Co., Pittsburgh, has been named manager of sales, with headquarters at Pittsburgh. He is succeeded at Detroit by N. A. Wade.

♦

Guy S. Warren, vice president and general manager, William H. Keller Inc., Grand Haven, Mich., tool manufacturer, has resigned his position as general manager but will retain his other office and his seat on the board of directors.

♦

W. L. Thoma, of the San Francisco sales office of Republic Steel Corp., has been promoted to district sales manager of that territory. After service in the United States navy during the World war, Mr. Thoma worked in the sales department of American Radiator Co., later becoming district sales manager, Marchant Calculating Machine Co., Chicago. In 1927 he joined Bourne-Fuller Co.'s Chicago sales staff and shortly thereafter was transferred to San Francisco where he became Pacific Coast manager, in which position he continued until the inclusion of Bourne-Fuller among the companies forming Republic Steel Corp. Since then he has been doing general sales work.

W. L. Thoma

Harry M. Francis

♦

L. E. Creighton, formerly vice president and general manager, Union Drawn Steel Co., Massillon, O., division of Republic Steel Corp., has been appointed manager of bar products, including both hot and cold drawn sales. He will make his headquarters in Cleveland.

Sales of hot rolled products will continue to be handled by W. F. Vosmer, manager of sales, bar division, and sales of cold drawn steel by F. C. Young, manager of sales, Union Drawn Steel division at Massillon.

♦

James M. Woodward Jr. has been named superintendent of bar mills, Gary works, Carnegie-Illinois Steel Corp. He joined the corporation Dec. 1, 1937, as superintendent of steel provision at Gary merchant mills. His experience in the steel industry, prior to joining the Gary works includes positions of inspector of rails, merchant bars and other products, chief inspector, engineer in charge of metallurgical laboratory, sales manager, strip mill recorder, general foreman of 4-high, hot strip mill.

♦

Charles Fassinger Sr. has resigned as vice president, Oliver Iron & Steel Corp., Pittsburgh. Mr. Fassinger started with the corporation in 1895, working up through the manufacturing departments to the general managership of the plant, and early this year was elected vice president in charge of development and research.

♦

Joseph Becker, vice president and a director of Koppers Co., Pittsburgh, also has been made president of Koppers-Rheolaveur Co., designer and builder of coal washing plants. W. S. McAleer, manager of Koppers-Rheolaveur, has been made a vice president and director.

♦

H. W. Merriman, Alan Wood Steel Corp., Conshohocken, Pa., has been elected president, Steel Club of Philadelphia. Other officers are: Vice president, J. A. Fisher, Wheeling Steel Corp.; secretary-treasurer, F. L. Shants, Lukens Steel Co.; directors, P. B. Burtis, Bethlehem Steel Co. and E. P. Norris Jr., Allegheny-Ludlum Steel Co.

♦

S. A. Crabtree and W. J. Jack have been named assistant district sales managers, Chicago territory, Republic Steel Corp. Mr. Crabtree began with Berger Mfg. Co., now a division of Republic, following graduation from high school. He was later transferred to the sales department of United Alloy Steel Co. where he worked as a clerk. In 1926 he became a clerk in the sales department, Central Alloy Steel Co. where he continued after formation of Republic, and in 1933 was transferred to Chicago.

Mr. Jack started as a junior clerk at the Hyde Park, Pa., plant of American Sheet & Tin Plate Co. in 1910. Subsequently he became storekeeper and chief clerk with West Leechburg Steel Co., leaving in 1917 to help build and install the hot and cold-rolled strip mills of Trumbull Steel Co., Warren, O. With the Republic-Trumbull merger

J. M. Woodward Jr.

in 1928 he was made manager of strip sales and in 1931 was appointed assistant manager of sheet and strip division, which position he held until his transfer to Chicago.

♦

Dr. Daniel S. Eppelsheimer, formerly with Union Carbide & Carbon Research Laboratory, Niagara Falls, N. Y., has recently been appointed research associate professor of industrial engineering, University of New Hampshire, Durham, N. H., to head up the industrial research of the engineering experiment station of the College of Technology. This department acts as the research laboratory for the small industries of New Hampshire.

♦

George J. Parker has been appointed assistant to district industrial engineer, Chicago district, Carnegie-Illinois Steel Corp. He began

George J. Parker

service with the corporation in April, 1936, at the Gary works. He was employed in the industrial engineering division and remained there until his present appointment.

♦

Charles A. Ferguson, former assistant general superintendent, Farrell works, Carnegie-Illinois Steel Corp., has been appointed assistant general superintendent, Gary sheet and tin mills. He has been with the corporation since 1913, serving as assistant master mechanic, master mechanic, assistant manager, manager and general superintendent of various plants.

John E. Angle has been named division superintendent, sheet mills, Gary works. He has served as cold reduction foreman, metallurgist, and in other capacities at the sheet and tin mills.

W. G. Hoffman, former chief engineer, sheet and tin mills, has become division superintendent of tin mills, Gary works. He became associated with the United States Steel Corp. in 1900 as an office boy in the general office of the American Sheet & Tin Plate Co., Pittsburgh.

Dr. D. S. Eppelsheimer

Fred K. Schefe, former assistant chief engineer, is now chief engineer, succeeding Mr. Hoffman. Ben Huff, former acting superintendent at the corporation's American works, Elwood, Ind., is now assistant to chief engineer, sheet and tin mills, Gary. Lee B. Landon, former assistant general superintendent, tin mills, is now superintendent of the corporation's American works.

♦

James H. Gamberton has been added to the technical staff of Acheson Industries Inc., New York, as mechanical engineer. He will supervise engineering tests involving new applications of the "dag" products of the company's affiliate, Acheson Colloids Corp. Eugene F. Heer, formerly associated with duPont, United States Rubber Co. and Truscon Laboratories, has been placed in charge of sales research activities at Port Huron, Mich., succeeding J. H. Fulmer, resigned. E. R. Hayes, formerly with Bay State Abrasives Co., has been added to the sales staff to represent the company in Michigan, with headquarters at 250 East Grand boulevard, Detroit.

DIED:

■ CARLETON S. KOCH, co-founder and president, Fort Pitt Steel Casting Co., McKeesport, Pa., Dec. 18 in Edgewood, Pa. Born in Buffalo, and a graduate of the school of mining and metallurgy, Massachusetts Institute of Technology, in 1898, he entered the foundry field a year later with William Sellers & Co. Inc., Philadelphia. Mr. Koch then joined American Radiator Co. as assistant manager, Titusville, Pa., plant, and in 1903 became manager, Franklin, Pa., plant of American Steel Foundries; later becoming manager of its Sharon, Pa., plant. In 1906 with the late W. L. Curry, Mr. Koch organized the Fort Pitt company, becoming president and general manager. In addition to being an honorary member of the American Foundrymen's association, he was a member, American Iron and Steel institute, American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers, and Society of Engineers of Western Pennsylvania.

♦

Frank G. Hogland, 74, president and founder, National Lock Co., Rockford, Ill., Dec. 13.

♦

George P. Ransom, president, Ransom Grinding Machine Co., Oshkosh, Wis., in that city, Nov. 27.

♦

Ernest J. Beyer, for 26 years an executive officer and production manager, Zenith Carburetor division, Bendix Aviation Corp., Chicago, in Detroit, recently.

♦

Ralph C. Velte, 55, vice president, Valley Mould & Iron Corp., Hubbard, O., Dec. 20 at Youngstown, O. He had been associated with Valley Mould & Iron the past 20 years.

♦

Thomas C. Sheehan, 68, retired president, Durham-Duplex Razor Co., and former president, Wade & Butcher, steel firm of Sheffield, England, Dec. 14 in Montclair, N. J.

♦

John E. Thropp, 56, president, William R. Thropp & Sons Co., Trenton, N. J., machinery manufacturer, in that city, Dec. 17. He was also president, Anchor Warehouse Co.

♦

Frederick A. Ingalls, 82, prominent for many years in Chicago industrial circles, at Pebble Beach, Calif., Dec. 12. He formerly was president, Buda Foundry & Mfg. Co. and the Ingalls Shepard Forging Co., and was vice president, Wyman-Gordon Co., Worcester, Mass.

♦

Charles Q. Garey, former chief designer, National Acme Co., Cleveland, recently at his home in Cleveland Heights, O. Prior to going to Cleveland he had been associated with Pratt & Whitney Co., Hartford, Conn.; Bryant Chucking Grinder Co. and the Jones & Lamson Machine Co., Springfield, Vt.

♦

Byron Richardson, 41, superintendent, Canton, O., plant of Republic Steel Corp., Dec. 16. He began his steel career with the Gary, Ind., works of United States Steel Corp., and before moving to Canton 15 years ago was associated with a New Castle, Pa., rolling mill and the Empire Steel Corp., Mansfield, O.

Shop Workers Exhibit Hobbies

■ A RECENT show by its employes is considered by the Warner & Swasey Co., Cleveland, as one of the best open-house features it ever has had. Exhibits were made by 85 employes, ranging from paintings and photographs, through taxidermy to model boats and bullet molding. So great was interest in the displays that many were unable to gain admission, though more than 5600 persons passed through the rooms.

The surprise feature was the high quality of exhibits and wide range of interests represented. A second show will be given next year. Without precedent to guide in making plans the company learned much about how such a show should be conducted.

From Tropical Fish to Doilies

Among the exhibits were live chickens and tropical fish, a model machine shop, complete hunting and fishing camp, models of sailboats, a battleship model, steam engines, airplanes, collections of stamps, coins, match books and pipes, mounted butterflies, tulip bulbs and doilies.

In planning for next year's exhibit the company is considering expanding the scope to include family exhibits, allowing one for each family, thus admitting wives and children in case the head of the family has no hobby.

The result of the exhibit is considered as a step in improving employe relations and acquaintance among the workers. It also showed people outside the organization something of the personnel and the attitude of employer and employes. Other business organizations interested in a similar project may obtain advice based on the experience by writing John C. Kline, supervisor of purchases, at Cleveland.

AVIATION

REDUCE AIRCRAFT WAGE MINIMUM AFTER PROTESTS

■ ESTABLISHMENT of a 50-cent minimum hourly wage in the aircraft industry by Secretary of Labor Perkins last week marked a significant concession to protests of manufacturers against preliminary recommendations of the public contracts board.

Objection followed the board's recommendation of a 60-cent minimum for the industry under the Walsh-Healey act. After further hearings the finding was revised to the 50-cent rate which has been accepted and promulgated. Left unchanged was the original 15 per cent maximum tolerance fixing the minimum rate to be paid learners and apprentices.

Special importance is attached to the government's action in view of an anticipated sharp expansion in military aircraft orders under national defense plans.

Similar protests have been filed by the steel industry against the board's recommendation of a 62½-cent minimum wage in northern steelworks.

$3,000,000 ALLOTTED FOR AIRCRAFT LABORATORY

President Roosevelt has approved a PWA allotment of $3,000,000 to the quartermaster corps for constructing a laboratory to do experimental and development work on aircraft at Wright field, Dayton, O. This was made from previous allocations of PWA federal funds which had not been put into use.

PLANE BUILDERS GO INTO 1939 WITH $150,000,000 BACKLOG

Despite accelerated deliveries the aircraft industry will enter 1939 with a record backlog exceeding $150,000,000. The piling up of unfilled orders is attributed mainly to rapidly increasing sales for military service and export.

Companies with heaviest bookings include: Lockheed Aircraft Corp., Burbank, Calif., $30,000,000; Douglas Aircraft Co. Inc., Santa Monica, Calif., $25,000,000; and North American Aviation Inc., Inglewood, Calif., $17,000,000. Lockheed's $30,000,000 backlog is more than its aggregate deliveries in the past six years. The company is stepping up production with view to eventual operation on a seven-day, two-shift basis.

Follansbee Bros. Given $3,000,000 RFC Loan

■ A loan of $3,000,000 by RFC to Follansbee Bros. Co., Pittsburgh, was announced in federal court hearing on reorganization proceedings last week. Request had been made for a loan of $4,000,000. The additional $1,000,000 will be raised by other means. John Follansbee, trustee for the company, indicated that a later move would be sale of $1,500,000 in common stock.

Confirmation of the reorganization was continued until March 16, the company being ordered to file a report March 9. The $4,000,000 is being raised to provide funds for a 43-inch hot strip mill at its plant at Toronto, O., and ingot and slab heating facilities. It is also planned to add a single-stand four-high cold reducing and skin pass mill for producing black plate for tinning.

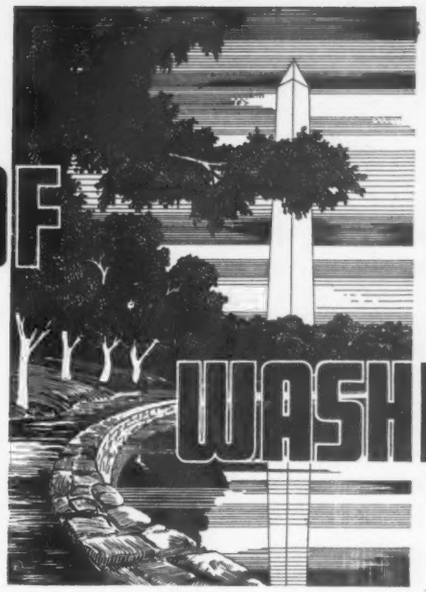
Lamson & Sessions Co. Dissolves Subsidiaries

■ The Lamson & Sessions Co., bolt and nut manufacturer, with plants in Cleveland and Kent, O., Chicago and Birmingham, Ala., is simplifying its corporate structure by dissolving two wholly-owned subsidiaries, The Lamson and Sessions Co. and The Lamson and Sessions Bolt Co. Exactly as before, sales and manufacturing will be independently managed as separate divisions, by W. M. Olsen as general manager in Chicago and George S. Case Jr. as general manager in Birmingham.

Both the subsidiaries are Ohio corporations, the former qualified to do business in Illinois and the latter in Alabama, they being the operating companies at these points.

■ **Engineering department employes of Warner & Swasey Co. show how they make ammunition for their hunting trips**

WINDOWS OF WASHINGTON



BY L. M. LAMM

Washington Editor, STEEL

WASHINGTON

■ OFFICIALS of the army and navy departments who are working on the national defense program for the President believe jobs may develop from this program for several hundred thousand persons. Large orders for war materials, including munitions, guns and other material, are expected to stimulate certain industries, including steel and others allied with shipbuilding and aircraft, if the plan goes through.

Many unofficial estimates have been made as to the money to be asked for shipbuilding and defense. An increase of $150,000,000 may be sought for the navy's shipbuilding plan, and labor department officials state this will mean work for about 81,000 persons. An increase of from 30,000 to 50,000 persons also is anticipated if the plan for war planes is adopted. This year's war department appropriations have already brought an increase in army ordnance orders to steel and other manufacturing plants.

REORGANIZATION BILL UP FOR EARLY CONSIDERATION

Insofar as preparations can be made, the President is all set for the convening of the new congress Jan. 3.

In the past week he held many conferences with New Deal legislators. There has been some talk that he will content himself this session with perfecting New Deal laws which now are on the statute books, rather than try to force through new legislation. At least, that is the present trend of New Deal thinking.

The reorganization of government departments will be for early consideration. Some congressional leaders believe the President will be able to force through a reorganization bill such as was defeated at the last session.

Senator Barkley, Kentucky, majority leader in the upper house, conferred with the President last week, and told newsmen that he discussed the whole legislative situation, although no definite conclusions were reached.

It is understood that aside from his government reorganization plan, the President has only one other piece of legislation definitely scheduled, the national defense program.

Senator Herring, Iowa, and Senator Vandenberg, Michigan, have disagreed as to an incentive tax bill. Hearings on this subject took four weeks. Senator Herring was chairman of the committee, and Vandenberg, who called for the investigation, was a member. Vandenberg apparently is for some kind of legislation along the incentive line, and he indicated last week his intention to introduce a bill dealing with the subject. Herring said that any tax incentive program for either profit-sharing or industrial stimulation would jeopardize the whole tax structure.

MANY PROPOSALS FOR RAILS; NEW BILL IN JANUARY

Representative Lea, California, chairman of the house committee on interstate commerce having charge of railroad legislation, stated last week he intends to have a new railroad bill ready for introduction early in January.

"I expect our committee to begin hearings early in the session," he said. "We hope to give all responsible parties an opportunity to be heard."

Included among proposals for railroads is the creation of a federal transportation authority to study the elimination of waste, to study consolidation, pooling of traffic, unified terminal operations, and similar "reforms." Also, the possible reorganization of the interstate commerce commission and the creation of a single governmental organization to regulate all forms of transportation.

There is talk about broadening the powers of the interstate commerce commission, or a similar organization, to permit consolidations of the carriers, with the scrapping of the present consolidation plan. The talk includes the possibility of legislation for bankruptcy revision and governmental financial aid.

HOPKINS TO "REVITALIZE" DEPARTMENT OF COMMERCE?

If current reports here are true, there seems to be no question but that President Roosevelt will appoint Harry L. Hopkins secretary of commerce to succeed Daniel C. Roper.

There are a good many reasons, apparently, why the President should not appoint Mr. Hopkins, but on the other hand there are many personal reasons why he should.

All of his life Mr. Hopkins has been engaged in social welfare work and at no time has he had anything to do with industry. Also, he has made remarks about the activities of industry which could not be considered complimentary.

The department of commerce has been disintegrating, step by step, ever since this administration came into power, and some feel that if Mr. Hopkins were appointed the department again might become a vital part of the government. At various times in recent years the marine activities have been taken away from it, and last year the aviation activities were put under an authority. Now up for consideration is the question of taking over the department's foreign service officers by the state department.

Most of the newsmen who are close to the White House have pre-

dicted Hopkins will get the commerce portfolio. However, a number of other men have been mentioned including Ambassador Kennedy; Averill Harriman and Donald Richberg. It is believed the President will not nominate either a secretary of commerce or an attorney general until after congress convenes Jan. 3.

MORE TRADE AGREEMENTS ARE NEAR CONCLUSION

Stanley B. Bruce, Australian high commissioner to Great Britain, was in Washington last week on his way back to Australia, and is reported to have discussed with American state department officials the question of a reciprocal trade agreement, which has been talked of for some months. Government officials would not discuss the chances of immediate action on such an agreement.

A new trade agreement between the United States and Turkey is practically ready for signature. Negotiations have been under way for almost a year. Negotiations are also pending for a similar agreement between this country and Venezuela.

Protest Wage Proposal At Washington Hearing

(*Concluded from Page* 15)

the labor department is ignoring the word "locality." He never dreamed, he said, nor did any other member of congress when the bill was passed, that anyone would ever consider Colorado and Sparrows Point, Md., in the same "locality."

Donald R. Richberg argued against the board's recommendations on behalf of the Sheffield Steel Corp., Kansas City, Mo. He referred frequently to his experience with the NRA and said that in those days they found the prevailing rates in certain localities were well below what it was believed existed.

The Walsh-Healey act, Mr. Richberg said, does not provide the basis for rectifying such a situation. The board has been thinking in terms of minimum wages from the standpoint of improving wage conditions. Mr. Richberg contended the board's definition for locality is laughable if it includes 36 states in the North.

Mr. Richberg also declared the board has not properly interpreted the act. He is "strongly of the opinion that the majority of the board has fundamentally failed to appreciate the controlling significance of the language of this statute."

Counsel for the Sheffield company contended the small mills should be protected. "It is apparent," he stated, "that the board has intentionally ignored all the small companies, and has based its recommendations wholly on the conditions controlled by the great steel companies."

Fred Farrar, representing the Colorado Fuel & Iron Corp., Denver, protested his firm has the same wage scale as that of the eastern steel mills. He pointed out that his mill is in a sparsely settled country; a long rail haul is necessary to get raw materials; and that the mill has competition with mills who have cheap water transportation.

He stated 25 per cent of the company's production goes within a radius of 300 miles while 50 per cent goes within a radius of 600 miles.

Eastern mills, said Mr. Farrar, can compete with the Colorado company on both the Pacific coast and Gulf ports. It is struggling to hold its own against keen competition.

He asked a differential as compared with Chicago and eastern mills. The company's present rate is 60 cents. The increase to 62½ cents, he said, would be more than the company could bear.

H. P. Bigler, representing the Rail Steel Bar association, Chicago, contended if the proposed rate is put into effect it will mean an increase of 40 per cent for workers. He said the rate now paid by the steel mills in Chicago is better than the labor rate paid in other industries in the same locality, and asked for some consideration for small mills and the narrowing of the term "locality."

H. W. Boal, Andrews Steel Co., Newport, Ky., said the contracts board had used the maximum labor rate in every locality while the law stipulates the minimum rate. His company made labor contracts at the labor department's request, he said, and the department now is trying to repudiate those contracts.

James K. Remsen representing the Rustless Iron & Steel Corp., Baltimore, said the minimum rate of his firm is 54 cents and that it is higher than the rate of most other industries in his locality. He said that government business for his firm amounts to only about 10 per cent of its production and it would not be worth while to change the labor rate for the government business.

Steel Wages Above Average

William B. White appeared for Sloss-Sheffield, Steel & Iron Co. Birmingham, Ala., and raised objection to the recommendations. He said he had made an investigation of 25 iron and steel companies in the Birmingham district and they employ 8000 persons at a rate of from 30 to 40 cents an hour. Twenty-four other kinds of plants in the same locality pay from 25 to 35 cents per hour. His company pays 40 cents.

J. T. Whiting, representing the Alan Wood Steel Co., Conshohocken, Pa., said that while his company employs only 3100 persons, it is the largest factor of employment in the community. He objected to the report and contended that it would be impossible to raise the minimum rate from 56½ to 62½ cents. He stated no other nearby industries now are paying 62½ cents.

Darwin S. Wolcott, on behalf of the Lukens Steel Co., Coatesville, Pa., said there should be a still further hearing in connection with the minimum wages with special reference to the small mills. He spoke of the survey made by the army and navy departments of small mills for war-time work and the fact that trial orders are being given to these mills by the war departments. He urged the position of the small mills be studied further.

Would Ruin Small Mills

Robert B. Thomas, speaking for a committee representing small Eastern iron and steel producers, requested a further study be made by the contracts board, especially as it affected the smaller mills. He asked this be done before a decision is rendered.

He said a rate of 62½ cents would be disastrous for many of the smaller mills and contended that because a mill is small is no sign it is inefficient. He told the secretary there must be a differential wage.

Lee Pressman made the argument for the SWOC, stating the bulk of steel industry is not contesting the board's tentative ruling. If the proposed wages are put into force, he said, "it will be the first time the steel industry has been on a competitive basis so far as labor is concerned." He declared the government cannot recognize a differential as between large and small mills.

At the conclusion of the argument counsel for several of the steel firms asked to be allowed rebuttal on some of Pressman's statements, but this was refused.

Among others appearing in protest to the board's recommendations: L. S. Harding, Crucible Steel Co. of America; Daniel Simonds, Simonds Saw and Steel Co., Lockport, N. Y.; E. J. Poole, Carpenter Steel Co., Reading, Pa.; Milton H. Tucker, for Granite City Steel Co., Granite City, Ill., and Laclede Steel Co., St. Louis, Mo.; Robert H. Brooke, E. & G. Brooke Iron Co., Birdsboro, Pa.; Wilbert Wear, Harrisburg Steel Corp., Harrisburg, Pa.; Harry L. Evans, Central Iron & Steel Co., Harrisburg, Pa.; A. J. Porter Jr., Heppenstall, Co., Bridgeport, Conn.; F. J. Tucker, South Chester Tube Co., South Chester, Pa.; Arthur W. C. Smith, Phoenix Iron Co., Phoenixville, Pa.; John H. Budke, Reeves Steel & Mfg. Co., Dover, O., and Parkersburgh Iron & Steel Co., Pittsburgh, Pa.; J. A. Lipscomb, International Union of Mine, Mill and Smelters Workers.

Freight Rates Present Obstacle to New Jersey Iron Ore Development

By H. M. ROCHE

■ FREIGHT RATES on New Jersey iron ore are relatively high compared to those for competing ores. This is retarding development of New Jersey deposits. Equitable rates would stimulate it, and result in larger business for the railroads in the state.

The estimated iron ore reserve in New Jersey is 600,000,000 tons, which is equivalent, after magnetic concentration, to 400,000,000 tons of high-grade shipping product.

In the central and northeastern states there are only two large iron ore districts, the Lake Superior region and the northeastern comprising New Jersey, New York, and Pennsylvania.

Since 1854 the lake mines have shipped approximately 1,650,000,000 tons to blast furnaces in central and northeastern United States. The reserve of direct-shipping material in lake mines is 1,500,000,000 tons, and at the present shipping rate of 50,000,000 tons per year, the life of this grade is only 30 years. Depletion of lake reserves may eventually create larger markets for the New Jersey, New York, Pennsylvania, as well as for foreign ores.

In the past 27 years approximately 44,675,000 tons have been imported. Since 1913 ore has been admitted duty free. It enters at New York, Boston, Philadelphia, Baltimore, and from Montreal, by way of the St. Lawrence.

The author is a consulting engineer, Dover, N. J.

Marked Decline After 1882

Up to 1882 iron mining was an important industry in New Jersey. After that year the lake and foreign material took the place of the more costly eastern ores, and most of the New Jersey mines were closed. In recent years the principal market for the New Jersey product was in eastern Pennsylvania. Since 1920 a large number of merchant pig iron furnaces in that district have been scrapped, and this market, in large part, has been permanently lost.

The chief market in the United States is in the Pittsburgh-Youngstown area. Because New York and foreign ores enjoy freight rate and other advantages over New Jersey. they have been sold in that great market for a number of years. So far New Jersey ores have not reached the Pittsburgh district because of excessive freight rates.

The following table shows rates on iron ore in cents per long ton-mile.

From:	Reading, Pa.	Pittsburgh	Steubenville, O.
New Jersey	$0.01275	$0.00565	$0.00571
New York	0.00471	0.00324	0.00337
Foreign	0.00358	0.00359	0.00296
Lake Superior	0.00240	0.00264	0.00254

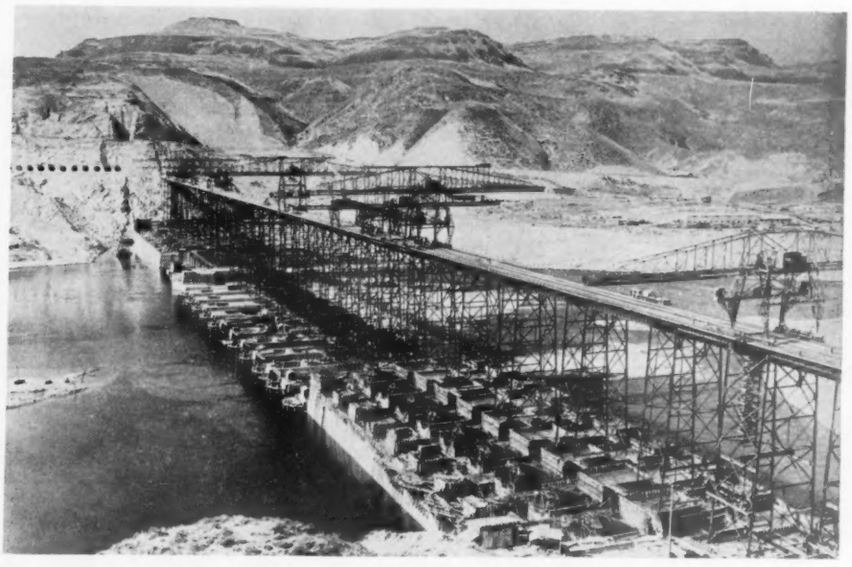
It is acknowledged that rates are not made on a ton-mile basis, but comparisons for one commodity by the ton-mile are logical, and accurately show the inconsistencies of the present method of rate making. It is only fair to say the difference in long and short haul rates make for some of the variations shown, but that does not account for the large differences in ton-mile cost. Note in the table the high freight on New Jersey ore.

The rate from New Jersey mines to the Pittsburgh-Youngstown area is $2.52 per ton. The same rate applies from northern New York mines to Pittsburgh and Youngstown, despite the fact the New Jersey haul is 360 miles shorter.

The rate on foreign iron ore from the Atlantic seaboard to the Pittsburgh-Youngstown district is $2.015 per ton. For New Jersey ores to compete with foreign they must have the same rate. This also would enable New Jersey to compete on a fair basis with northern New York.

Most of the eight railroads which cross the mine areas in New Jersey and which would participate in haulage do not get any of the foreign or New York state ore tonnage. If these roads want to share in any future movement to the Pittsburgh-Youngstown area it is obvious they will have to establish nonprejudicial rates.

Dam To Swallow 8600-Ton Steel Trestle



■ Largest of the steel trestles to be buried in concrete to form Grand Coulee dam, Washington, this span is 3600 feet long, required 8600 tons steel. From trains coming in on the railroad tracks it carries, cranes will lower the concrete into forms resting on the dam's foundations, until eventually the steelwork will be completely encased. Trestle was designed, fabricated and erected by Bethlehem Steel Co., fabricated steel construction division

Scrap Balers To Organize

■ Scrap dealers manufacturing No. 2 hydraulic compressed bundles, numbering about 113, will hold a special conference Jan. 10 in connection with the eleventh annual convention of the Institute of Scrap Iron and Steel Inc., at St. Louis. Formation of a scrap balers' association within the Institute will be considered. S. H. Bassow, Bassow Bros., New York, will preside.

The conference will discuss market possibilities, methods of manufacture, proposal for identifying or certifying bundles and education of steel mills in the value of this scrap. Preliminary action toward formation of such an association was taken at Pittsburgh, May 12.

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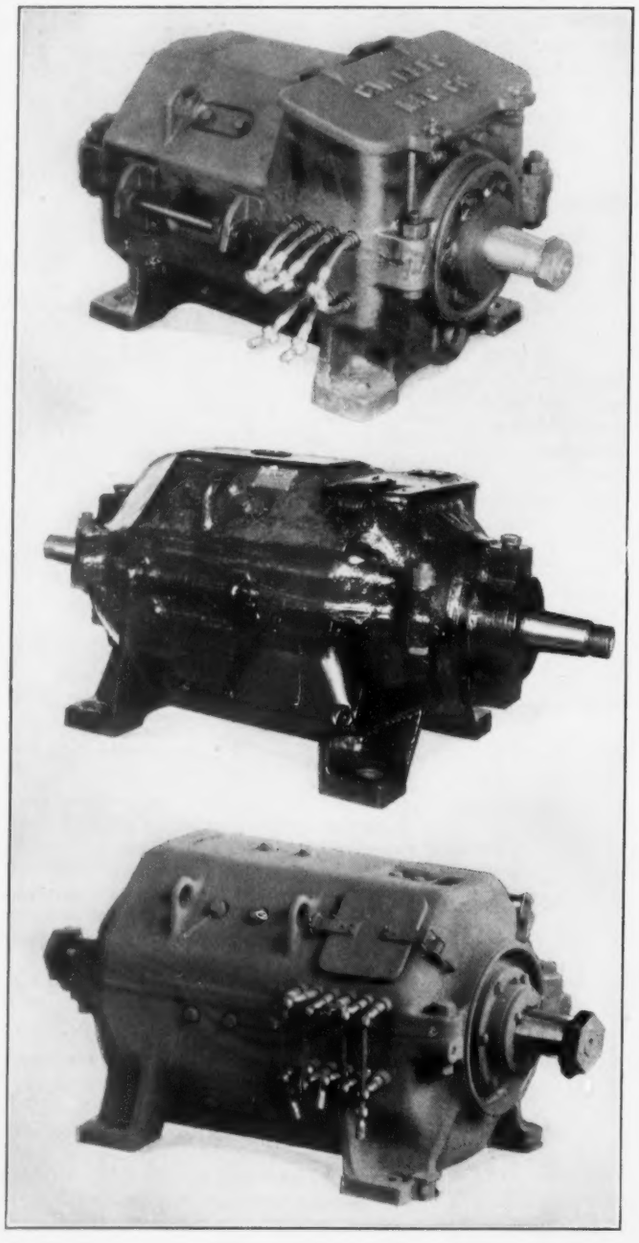

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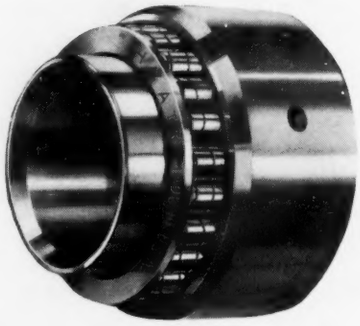

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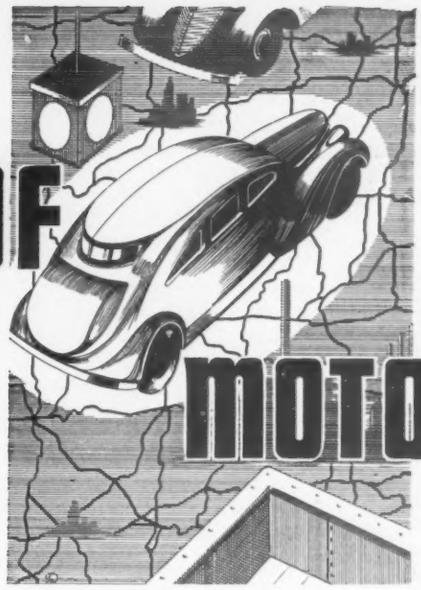

DETROIT

■ As the old year draws to a close the time for retrospect is at hand. Looking back over automobile production for the past several years, a salient point is the continuation of sharp seasonal swings, both in good years and in bad. These surges, coupled with the declines which always follow, have been anathema to the industry for many years, possibly because of the effect they exert on employment and layoffs.

Stability in automobile labor is unknown. Working forces either are flocking to jobs by the thousands or are being furloughed in similar numbers. This is perhaps the chief reason why workmen in auto plants were so susceptible to union organizers. But organizers have been unable to introduce much stability in employment by their efforts. In fact, their activities have worked with the reverse effect.

When the New Deal first came into view, one of the first problems it attacked was this instability. After weeks of research and discussion the suggestion was offered and adopted to move up the date of new model introduction to the fall, so that initial demand for models would carry employment through the winter months. This plan worked, after a fashion, but it simply re-located the seasonal surges and declines in the yearly production curve.

Want Stabilization

There is probably no single achievement which the automobile industry, its working forces, government, labor and tributary industries would more like to see than actual smoothing out of the automobile production curve and a stabilization of employment throughout the year. So that, for example, a supplier of steel would know in advance that auto plants could be counted on to take specific tonnages at certain definite intervals throughout the year, or that a worker in an auto plant would know for a certainty during 1939 he would have, say, 45 full weeks of employment. But how to do it?

BY A. H. ALLEN
Detroit Editor, STEEL

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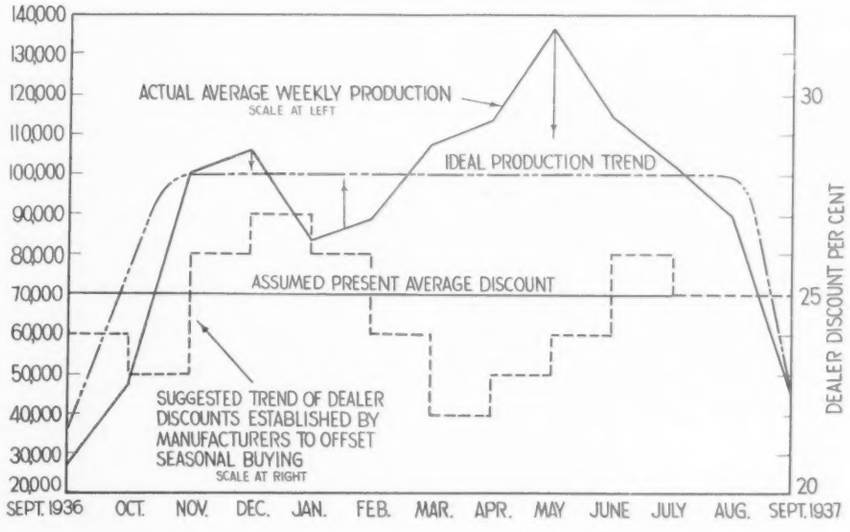
First, let us see what causes the production curve to behave in the way it does. Take the year 1937 as a case in point. The accompanying chart shows average weekly automobile production plotted from September, 1936, for the ensuing 12 months. Note how it starts at the low level of 26,900 and quickly climbs to an initial peak of 104,900 in December, then slackens to 83,100 in January, resumes the upward march to a second peak in May of 136,600, then skids to a finish in September, 1937, with 45,300.

The explanation of this movement is simple. Introduction of new models, accompanied by the usual fanfare of auto shows and concentrated merchandising effort stimulates the buying public into placing orders for new cars. This, plus the urgency to build up inventories accelerates car assemblies at a furious pace.

By December, dealer inventories have been fairly well satisfied, Christmas buying concluded, and the onset of cold weather over a large part of the country begins to hold back demand. So closely coupled are consumer demand and factory schedules that any easiness in the former is reflected within a week or two in plant output. As spring ap-



■ To level off peaks and valleys in automobile production it has been suggested that dealer discounts be made higher in periods of slow demand and lower when buying is heavy. This chart shows the "ideal production line", contrasted with actual performance in 1936-37, and a possible corrective variation in dealer discounts

proaches consumer demand comes out and the pace of new orders quickens. Dealers decide to stock up more heavily. Production promptly shoots up. By May 15, the spring peak has passed and buyers already are beginning to consider what may be in store for the next year's models. Production shrinks, and every sharp drop usually is accompanied by a reduction in employment. Auto employment figures are not quite as sensitive to consumer demand as are assemblies.

Superimposed on the accompanying chart is a second production trend line which may be considered to represent an "ideal" curve for the 1937 model year. It rises quickly in October and levels off at around 100,000 average weekly production, holding to this point until late summer when the model changeover period arrives. It probably would be the millenium if such production could be realized, but at least the curve represents stabilized output, toward which the industry is aiming. Arrows on the actual production curve show the direction in which output must be adjusted to reach the ideal plane.

Could Control by Discounts

The only possible way in which manufacturers could attain such an ideal output is to refuse to supply cars when the demand is there, and to build up inventories when the demand is absent. This is obviously both bad business and impossible of achievement, since dealers will not overstock when consumer demand is poor and manufacturers cannot force dealers to take any such oversupply of cars.

But manufacturers do have one important control over dealers, and this is in the matter of discounts. Wholesale discounts to dealers now vary widely according to makes. A manufacturer with relatively small output and few dealers, may offer 30 per cent or more to attract new dealers. Old established lines, with thousands of dealers and yearly sales in the hundreds of thousands, may offer discounts of less than 20 per cent. However, let's assume dealer discounts now are averaging 25 per cent.

The suggestion has been made, by an executive of a large steel company, that automobile companies take advantage of these discounts to counteract the seasonal trend in consumer demand; that is, vary the discounts by a few per cents so that dealers will have the greatest incentive to sell when demand is slack, and the least incentive to sell when consumer demand is flourishing.

Naturally, this would presuppose some unanimity of action by all auto producers. But under the leadership of one or two of the larger producers, a satisfactory agreement might be reached.

Again referring to the chart, the monthly trend line for suggested dealer discounts is plotted in such a way that reductions in discounts are affected slightly in advance of normal peak demand periods, and increases in discounts are made just prior to customary lapses in demand, the net effect being presumed to be a leveling off of production to somewhere near the ideal line.

Dealers might resent such an arrangement at first as an unfair restraint of trade, but actually it is not so much a restraint of trade as it is a restraint of profits in periods periods when consumer demand is seasonally stimulated, which is after all no accomplishment of the dealers.

It would mean a concentration of dealer merchandising efforts in January and February and again in July and August to take advantage of the higher discounts offered.

In the long run it would mean stabilization of a dealer's sales as well as factory output, and there are many advantages in stabilization of dealer activities. A further result might be that "rush" deliveries of new cars would be ended. With dealers in no hurry to move cars during peak demand periods, because of reduced discounts, the prevailing buyer then might be forced to wait for a month or two to obtain delivery. This is no serious objection, however, since the average buyer is not so vitally concerned with immediate delivery of a new car as he thinks he is.

In past years, there have been many occasions when a wait of six weeks or more was necessary to obtain delivery of a new car, and cancellations of orders were not accepted. Once the buyer understood he was contributing to stabilization of the automobile industry he probably would be content to bide his time on deliveries.

Anyway, this constitutes a rough outline of a suggestion for production stability. Numerous refinements likely would be needed, and the ultimate practicability of the plan could be demonstrated only by actual tryout.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	215,296
Nov.	405,799	376,629	*390,000
11 mos.	4,097,316	4,669,088	*2,248,331
Dec.	518,958	347,349	.....
Year	4,616,274	5,016,437	.....

*Estimated.

Estimated by *Ward's Reports.*

Week ended:	1938	1937†
Nov. 26	84,930	58,955
Dec. 3	97,795	86,848
Dec. 10	100,705	85,765
Dec. 17	102,905	82,025
Dec. 24	92,890	67,230

†Comparable week.

	Week ended Dec. 24	Dec. 17
General Motors	38,875	44,125
Chrysler	21,960	27,700
Ford	22,200	21,450
All others	9,855	9,630

■ INTEREST is quickening in two new types of cast steel being offered by Detroit Steel Casting Co. for tools and dies used by the automobile industry. Identified as E-3 and E-4 steels, they are of the low-alloy type (total alloy content approximately 1.5 per cent), the former containing about 1 per cent copper and the latter containing high manganese and molybdenum. The E-3 steel may be heated and quenched in cold water without cracking even in sections as heavy as 2 tons. The E-4 steel is readily susceptible to flame hardening, an increase of from 220 to 630 brinell in surface hardness being possible by flame treatment at about 1550 degrees Fahr.

Used for Body Dies

The latter steel is now being used in a number of plants for body dies, punches, trimming dies and the like. One important advantage lies in the fact the steel may be machined in the soft condition, then supported in a press. Areas subjected to wear then are hardened by passing a torch over them. Subsequently, if engineering changes are required, these areas may be softened by heating below the change point making the design alterations and then rehardening. The steel is reported to be readily weldable and has tensile strength in the range of 100,000 to 150,000 pounds per square inch with good ductility.

Low-alloy, high-tensile, rolled steels are being used to good advantage in truck and trailer body construction. Fruehauf Trailer Co., here, reports the recent fabrication of a light-weight tank trailer of this material weighing 6950 pounds and capable of carrying a payload of 25,000 pounds, a ratio of weight to payload of 1 to 3.6.

Factory sales of automobiles in November were 372,359 cars, against 209,522 in October and 360,055 in November, 1937. For 11 months factory sales were 2,101,209, against 4,482,740 in same period last year.

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UNITED STATES STEEL

EDITORIAL

Profits Are Needed for Real Recovery

■ IT NOW is understood widely that unemployment is the country's No. 1 problem and that we cannot have real prosperity as long as a large percentage of our employable workers are unable to find jobs. Many able minds are addressing themselves to the solution of the unemployment problem, and recommendations vary in accordance with individual thinking.

In a recent address (STEEL, Dec. 19, p. 33), Dr. O. M. W. Sprague, Harvard university, held that lower prices will pave the way for more re-employment. Low prices, he declared, will result in more sales that will permit larger production and provide more jobs. Assuming that business will expand early next year, he cautioned manufacturers against price advances that might smother demand. Further, he predicted, price advances surely will bring demands for increased wages. Dr. Sprague held that a policy of reducing prices wherever possible is one that will promote a friendlier attitude at Washington toward business.

Danger of Unprofitable Operation Menaces Future of Industry

This is logical thinking. History shows that when prices rise to undue levels, buyers are attracted in decreasing numbers. This fact now is borne in mind by many forecasters, particularly those who predict a building boom early next year; they believe this boom will collapse about the middle of the year due to higher wages that will be insisted on by workers in the building trades.

But Dr. Sprague's recommendation comes at a time when industry in general has anticipated it by selling at prices which in many cases are too low. This is especially true in steel and many steel products such as bolts, nuts and rivets. Many of the products of industry at this time are being sold at prices that represent substantial losses. And where profits are made they are small as a rule. The important question as to prices at this time is not whether they are too high but whether they are not too low.

For it is becoming increasingly apparent that today's selling prices are having a strangling effect on business in the so-called capital goods industries—and it is there that the level of business health best can be appraised. Companies can modernize and expand only when they have money to spend on such programs. They can obtain such money only from profits or from new capital. In either case profits are necessary because a prime requisite for obtaining new capital is the assurance of profits. The banks, the trust companies, the life insurance companies and other guardians of money, in particular, are in no position to invest in or make loans to obviously unprofitable operations.

Fuller Employment Possible Only When Work Gives Financial Return

Always in the past lower selling prices were paralleled by lower wages and other costs. Manufacturers today are unfortunate in having to function under a system which affords them little flexibility in shaping effective managerial policies. Because of laws or governmental influences, they have little or no control over wages, hours, taxes and many other costs. Though most of their cost factors are rigid, they have no control of selling prices. Further, they have been urged by government to lower prices.

The time has arrived when everybody in the United States should understand that industry must make reasonable profits. Without profits, new money will not be attracted into industry. Without profits, there cannot be the expansion that is necessary to bring a solution to the No. 1 problem—unemployment. The emphasis from now on should be on profits and not on low prices.

In particular, manufacturers must realize, no matter how various laws and governmental policies hamper them in managing their business, that they are not helping to build real prosperity in this country by operating at loss or with slight profits.

THE BUSINESS TREND

Industrial Activity Recedes Seasonally

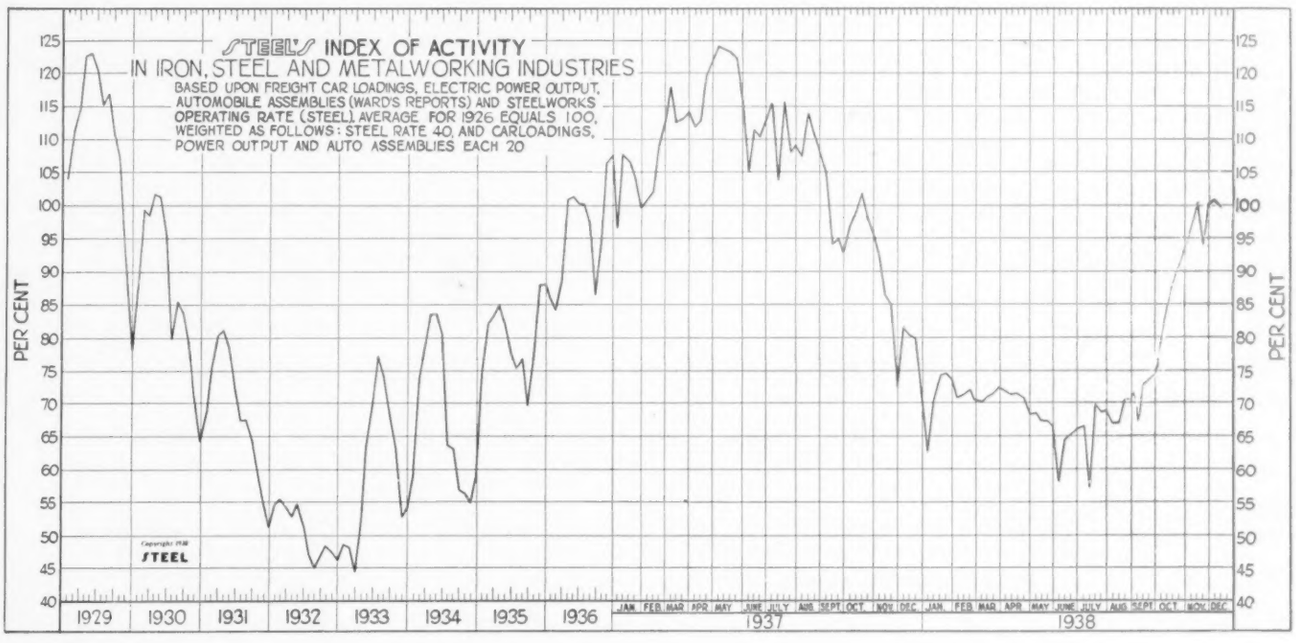
■ INDUSTRIAL activity suffered a mild seasonal reaction in the week ended Dec. 17 from the upswing recorded during the past few months. As a result, STEEL'S index of activity in the iron, steel and metalworking industries eased 0.9 point to 99.8. However, the index remains well above the 79.4 recorded in the identical week last year.

Contributing to the recent decline in the activity index for the week ended Dec. 17 were moderate losses in two of the four barometers from which the index is composed.

Steelmaking operations eased to 58 per cent in the week ended Dec. 17. This compares with 61 per cent in the preceding week, but is more than double the 27 per cent reported in the same week last year. The decline in the national steel rate during the holidays may prove to be less than usual this year. The railroads have recently placed sizable orders for rolling stock and rails, while some automotive interests have again entered the market for moderate tonnages of sheets and strip.

Automobile assemblies in the week ended Dec. 17 reached a new 1938 high. The 102,905 units assembled in that week compare with 100,705 in the week ended Dec. 10 and also exceed the 82,025 cars produced in the same week last year. There are sound indications that the lag in production during the winter months will be definitely less than normal. November factory sales of automobiles in the United States were 372,359 vehicles, against 209,522 in October and 360,055 in November, 1937. Sales for the first eleven months totaled 2,101,209 units, compared with 4,482,740 in the same period a year ago.

Electric power consumption reached a new all-time high in the week ended Dec. 17. Power output in that week of 2,332,978,000 kilowatt-hours not only recorded a moderate increase over the former peak this year of 2,318,550,000 kilowatt-hours, but also exceeded the pre-


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100. WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
PER CENT
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
STEEL

STEEL'S index of activity declined 0.9 points to 99.8 per cent in the week ended Dec. 17:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Sept. 10	66.8	94.3	83.1	70.1	53.5	65.5	44.9	60.9	85.9	114.0
Sept. 17	72.9	95.0	90.1	69.4	58.7	69.1	47.8	65.6	86.2	112.2
Sept. 24	74.0	93.0	86.2	68.5	58.1	68.2	48.0	65.2	83.8	110.7
Oct. 1	74.9	96.6	89.0	73.3	59.3	66.9	47.7	62.4	81.0	109.1
Oct. 8	78.9	99.0	93.4	74.9	54.7	67.4	48.4	61.5	79.4	108.2
Oct. 15	84.3	101.8	95.5	77.4	56.4	66.0	48.7	57.9	77.5	106.1
Oct. 22	88.7	97.5	97.1	82.4	58.2	60.9	48.7	58.2	77.4	104.8
Oct. 29	91.4	95.7	99.1	86.4	56.3	58.0	48.3	55.9	72.5	102.5
Nov. 5	93.4	92.3	102.1	88.4	55.0	52.3	48.5	56.0	71.5	98.1
Nov. 12	95.9	86.5	107.9	88.8	54.9	50.7	47.7	55.5	73.0	91.6
Nov. 19	100.4	84.9	109.9	90.9	55.2	52.6	49.2	54.8	71.0	87.8
Nov. 26	93.9	72.7	105.2	86.0	54.4	55.4	44.5	51.4	66.9	80.9
Dec. 3	100.1	81.5	108.4	91.7	51.9	49.7	45.3	52.9	69.2	85.0
Dec. 10	100.7	80.5	113.9	91.8	56.8	52.6	46.6	53.1	68.2	83.4
Dec. 17	99.8*	79.4	114.8	91.9	60.6	56.0	49.3	52.3	67.3	79.7

*preliminary.

vious all-time peak of 2,320,982,000 kilowatt-hours consumed in the week ended Sept. 4, 1937. A year ago power consumption of 2,202,200,000 kilowatt-hours was substantially below the current level. Power output is expected to remain at the present peak levels through the week ended Dec. 24.

Estimate of freight carloadings declined slightly more than seasonally in the week ended Dec. 17 to 603,000 cars. This represents a decline of 16,340 from the 619,340 loaded in the previous week, but remains substantially unchanged from the like 1937 week when loadings were 603,292. The peak this year in revenue freight carloadings was 708,840 recorded in the week ended Oct. 29.

In contrast with machine tool orders, demand for foundry equipment during November recorded a small gain over the October level. The index of the Foundry Equipment Manufacturers association stood at 89.7 for November, a gain of nearly two points over October. The index was 129.03 in November, last year. Shipments were indexed at 94.5 up slightly from the 93.4 in October, but substantially below the 178.8 in November, 1937. Unfilled orders stood at 87.0, moderately below the 91.8 reported in October, and less than one-third of the 294.0 recorded in November last year.

Commercial failures in November were 1.3 per cent below the October level, compared with an average decline in the month for the 10 years, 1928 to 1937, of 6 per cent. A total of 984 insolvencies were reported in November with liabilities of $12,302,000, against 997 with liabilities of $13,219,000 in October and in November, 1937, 842 firms failed for $16,400,000. Contrary to the general trend, manufacturing and construction disasters were smaller during November than in the same month last year. The retail group which customarily comprises more than half the total failures, occupied its usual relative position in November.

Further seasonal easing in STEEL'S index of activity is anticipated through the remainder of the year. The national steel rate will probably recede further reflecting the holiday shutdowns, while revenue freight carloadings should continue to decline seasonally. Auto output is expected to remain around the 100,000 cars-per-week level and power output probably will hold to high levels in the week ended Dec. 24. However, the outlook for the period soon after the first of the year is predominately optimistic, based on renewed activity in the construction field and the brighter prospects for the railroads through possible government legislation.

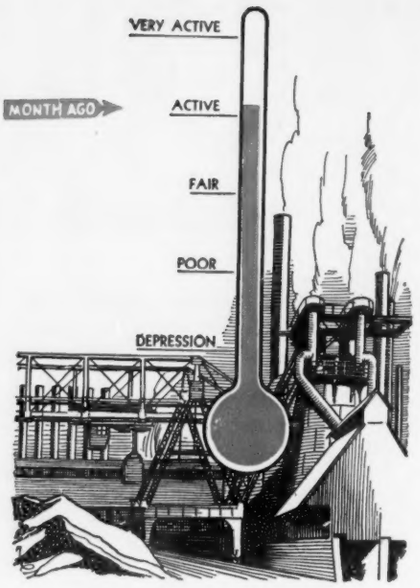
Where Business Stands

Monthly Averages, 1937 = 100

	Nov., 1938	Oct., 1938	Nov., 1937
Steel Ingot Output	86.1	75.1	54.0
Pig Iron Output	75.7	66.3	66.5
Freight Movement	87.6	97.6	90.5
Building Construction	*120.4	135.4	78.5
Automobile Production	*93.3	51.5	90.1
Wholesale Prices	*89.6	89.9	96.5

*Preliminary.

Industrial Weather



TREND:

Unchanged

The Barometer of Business

Industrial Indicators

	Nov., 1938	Oct., 1938	Nov., 1937
Pig iron output (daily average, tons)	76,218	66,694	66,901
Machine tool index	115.9	118.8	163.5
Finished steel shipments	679,653	663,287	587,241
Ingot output (daily average, tons)	137,393	119,921	86,151
Dodge building awards in 37 states (sq. ft.)	*45,000,000	50,609,000	29,336,900
Automobile output	*390,000	215,296	376,637
Coal output (tons)	*35,480,000	35,094,000	36,428,000
Business failures; number	984	997	786
Business failures; liabilities	$12,302,000	$13,219,000	$10,078,000
Cement production (bbls.)	.....	11,556,000	9,248,000
Cotton consumption (bales)	.....	542,778	485,000
Car loadings (weekly av.)	635,738	708,396	656,909

*Preliminary.

Foreign Trade

	Nov., 1938	Oct., 1938	Nov., 1937
Exports	.....	$277,928,000	$314,682,000
Imports	.....	$177,979,000	$223,226,000
Gold exports	.....	$16,000	$30,084
Gold imports	.....	$562,382,000	$52,194,000

Financial Indicators

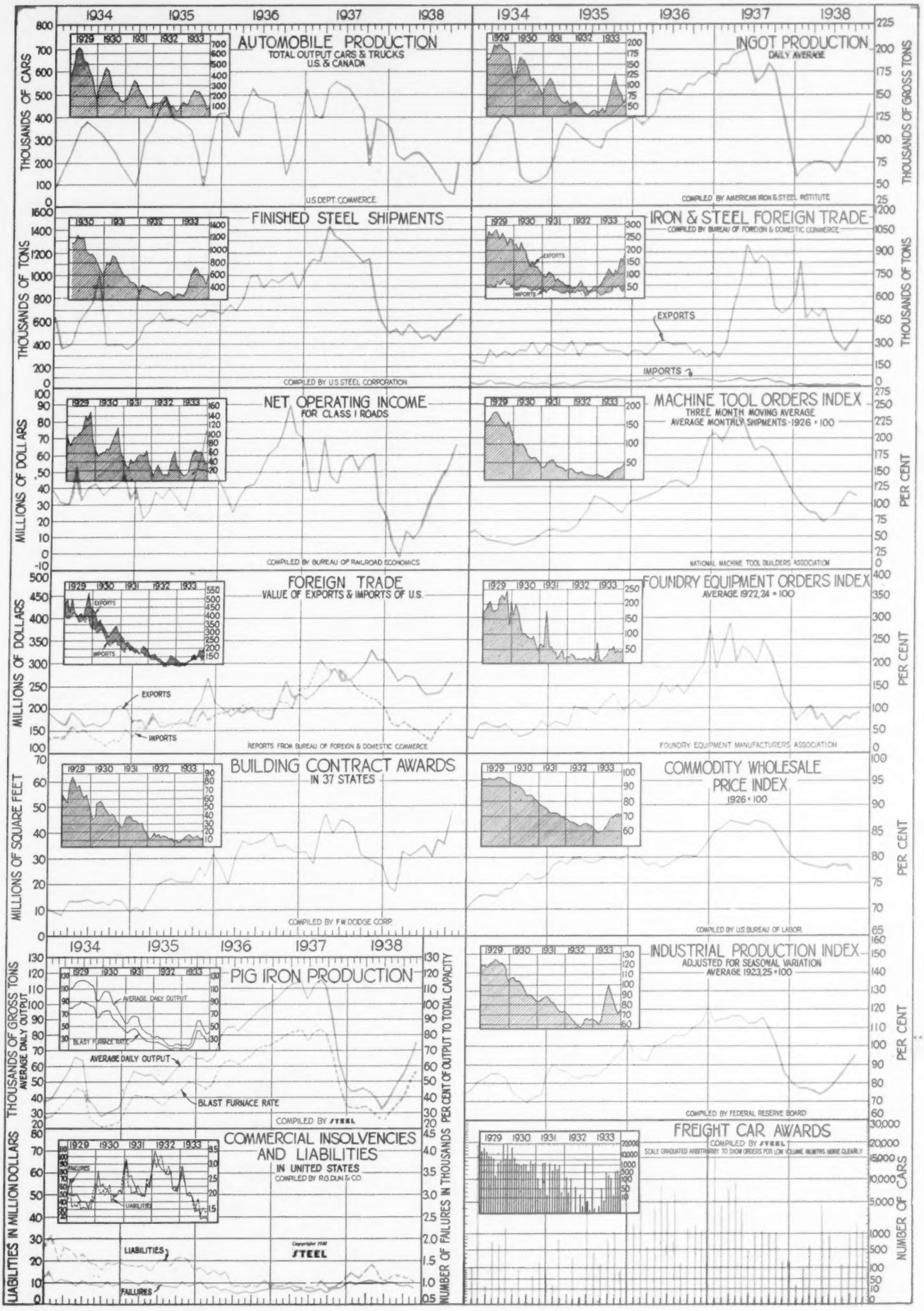
	Nov., 1938	Oct., 1938	Nov., 1937
25 Industrial stocks	$186.99	$189.69	$157.93
25 Rail stocks	$23.59	$23.95	$24.84
40 Bonds	$72.00	$68.41	$76.41
Bank clear'gs (000 omitted)	.....	$24,011,000	$21,796,000
Commercial paper rate, New York (per cent)	⅝	⅝–¾	1
*Com'l loans (000 omitted)	$8,317,000	$8,346,000	$9,479,000
Federal Reserve ratio (per cent)	83.6	83.2	80.0
Railroad earnings	†$68,565,755	$50,361,753	$60,860,439
Stock sales, New York stock exchange	27,922,955	41,560,940	29,264,906
Bond sales (par value)	$156,222,675	$185,452,075	$172,175,525

*Leading member banks Federal Reserve System.
†October, September and October, respectively.

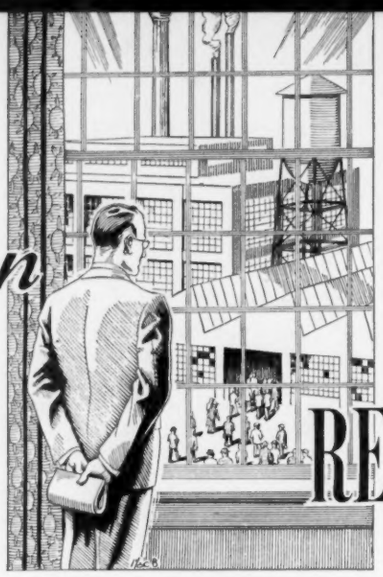
Commodity Prices

	Nov., 1938	Oct., 1938	Nov., 1937
STEEL'S composite average of 25 iron and steel prices	$36.39	$36.48	$38.96
U. S. Bureau of Labor index	*77.3	77.6	83.3
Wheat, cash (bushel)	$0.78	$0.81	$1.05
Corn, cash (bushel)	$0.61	$0.63	$0.70

*Preliminary.


1934 1935 1936 1937 1938
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS · 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
MILLIONS OF SQUARE FEET
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
FAILURES
Copyright 1938 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS PER LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Forum on RE-EMPLOYMENT



■ WHILE readers of STEEL are inclined to consider problems of stabilization of employment primarily in terms of the durable goods and the raw material industries, they should recognize that until their customers in the consumer goods industries make some headway toward regularizing their own production, there can be but little progress toward regularization in the basic industries.

Therefore it is news of prime importance to those concerned with metal producing, with metalworking and with metalworking machinery, that stabilization of production—and hence of employment—actually has been achieved by one of their customers, a large manufacturer of soap, and by a number of other highly important producers of consumer goods.

Such is the message brought to us this week by R. R. Deupree, president of the Procter & Gamble Co., Cincinnati, submitted in the form of an address before the National Association of Manufacturers recently.

While he does not believe that any one stereotyped plan will work in all industries—or even in any two industries—he does point out certain fundamentals which must be recognized. Above all, Mr. Deupree emphasizes that stabilization of employment is a problem which—unless it is solved promptly by management—may be taken out of the hands of mangement.

—The Editors

■ STABILIZED employment is one of the great needs of American industry. Any business which can work out a plan whereby its employes are given steady work realizes regular production economies. A man improves on the job—and often improves his job when he works steadily. But immediate savings is only one consideration; long term benefits are just as marked.

Steady work makes satisfied workers, and no one can underestimate the importance of that fact today. I consider the most important phase of our relationship with our employes to be assurance of steady work. Pension plans, profit sharing, sick benefits, Christmas baskets, etc., are important, but nothing takes the place of a steady job.

Back in 1931 Mr. Procter said, "It cost us $400,000 to keep the 48-week work plan in operation. But in other bad years we have had to close down some of our factories, whereas in 1929-30 we did not close an hour. I think most experts would agree that stoppages and replacements would have cost us far more than the amount we spent, which was approximately $70.00 per employe."

You may think—and you are right—that the soap business is a supremely steady one. But bear in mind that in no business or industry has it been easy to think through and set up a precise, workable, steady employment plan. There are no panaceas, no hard-and-fast rules, no pots of gold at the end of the rainbow. Steady employment is obtained much easier in one industry than another, and even in one division of a single business than in another division of the same business. So a blueprint for one may make mighty poor reading to another business.

Steady Work Is Basis

It is a fact, however, that throughout this country there are many plans in operation today. All of them, as far as I know, are different, yet all point to the same objective, namely, steadier employment. It is because of my work during the past six months with the committee of the Business Advisory council dealing with this subject that I do not like to generalize or to lay down any set procedure for all industries. I only want every one of you to realize that the companies which have spent time, effort, and money to plan for steady jobs for their employes have, in every instance I have known, found it to be a sound investment. So far as I know, each and every manufacturer is satisfied that his plan is not too costly when he considers the

ultimate result—namely, steady income for his employes.

It is my belief that the one outstanding desire of any man is the opportunity to work—with the assurance that if he works well, he will continue to hold his job. To plan his family life, he must have some idea of his income for the next six months or a year. To put yourself in his shoes, you must strip yourself of all capital income and rely solely upon a daily wage, without any positive assurance of work beyond the next eight-hour day. It is not a pleasant thought. If you think of one workman, one employe, this way and then multiply that one man by several million wage earners, you begin to realize the vital importance of this problem in our national, social, and economic life.

It is a problem we must face. Understand, I am certainly not advocating a guaranteed yearly income or even a guarantee of a definite number of work weeks per year, but this uncertainty of steady work for any man who is capable and willing to work is an ulcer which has eaten deep into American industry and poisoned it with many a difficult labor problem.

Mr. Hormel of the Geo. A. Hormel Co., Austin, Minn., told me recently: "Since our plan has been operating on a straight-time basis (their form of a steady employment plan), the house building in Austin has proceeded on a fairly level basis from year to year." Mr. Hormel concludes that if all the consumer goods industries would provide continuity of income to their employes, the violent fluctuations in the heavy industries would be materially reduced and greater security would be felt by all—followed inevitably by better working conditions.

Wage Increases Absorbed

Two manufacturers, who put steady employment plans into effect, report as follows: One plant has absorbed a 35 per cent increase in hourly wages and the other a 50 per cent wage increase over a seven-year period, and yet in both businesses the unit cost of production has remained quite even.

Now, don't misunderstand me. In neither case was a steady work plan the only thing done, but the crux of my whole story is that the management which works out a plan such as this is usually working on other phases of employer-employe relationship at the same time. The minds of his employes, receptive because of a steady job, are open to improvement in their job and in the business as a whole.

I cannot emphasize this fact too strongly. In all of the plans you will discover one common element. The management has peeled off its coat and rid itself of the unessentials, the spasmodic fringes of its business. It has studied and restudied the fundamentals—analyzed everything from the factory floor plan to distribution methods. In Procter & Gamble's case, for example, the 48-week plan meant a complete change in a general sales policy which had been established for half a century.

I would like to cite three short examples of plans in operation merely to point out procedures.

First—Company A. The management of this company decided that it was going to pay a regular weekly income based upon a standard

© Nickolas Boris

R. R. Deupree
President, The Procter & Gamble Co., Cincinnati

work week of 40 hours, at a specified rate per hour governing each individual job, whether the men worked or not during any given week. The basic idea was to give the men so many hours of work during the year. Heavy work weeks and light work weeks tended to balance each other out in this plan. As a matter of fact, it was formulated on a long-term yearly basis, debiting employes for hours which were not worked and crediting them with extra hours worked in subsequent weeks.

Company B's plan works on the same general principle. They pay 60 per cent of a normal week's salary, if men are not working. Then by debiting and crediting hours, they work out a steady balanced payment plan for the year. Income of the individual employe also is based upon a certain percentage of the sales price of the finished article. The man in charge of this plan feels that every business has to figure what per cent of the finished article price wages represent and then keep the men's wage scale flexible enough to vary up-and-down with the realized price of the product. I am not sure, but I think this is also the basis of compensation in the copper industry. This idea takes into consideration fluctuations in the cost of living, because price levels of the products of basis industries largely determine general living costs.

Stabilizes Production

Company C realized that the consumption of its products varied very slightly during a year. If C were willing to do its own warehousing, a sales policy could be arranged which really prevented shipments in any one month being greater than 10 to 20 per cent above the normal planned production. Dealer demands and speculative periods had forced these excess shipments, but it was found dealers were very content not to have excess deliveries forced upon them. With the selling plan straightened out to meet the situation, it was not too difficult to operate steadily 48 out of 52 weeks.

In connection with Company C's plan, I wish to point out that if any industry can forecast, within 10 per cent, its consumption line for one year in advance, it is possible for the management to work out details of steady employment. For example, if a business has a consumption line of 100, and produces 115 units in any one month, then, almost inevitably, it must compensate with an 85-unit production in some other month. Likewise, if a 100-unit industry, without planning, produces 130 units throughout a given year, the chances are it will produce only 70 units during the succeeding year.

I have cited these examples merely to show you that different manufacturers are working out their problems in an entirely individual manner. As I told you before, I have seen no two plans alike.

What about the Wages and Hours law? In time, I hope that some recognition by exemption from the rigidity of hours in this law will be given to those companies who are attempting to bring about regular income to their employes. If some concessions are not made, this law can deal a telling blow to plans already formulated and can interrupt and delay future effort.

This rigidity of hours in the Wage and Hour law, however, must *not* stop our effort. We know it is there. We know it is bothersome, but I think we also know that it is fair to assume it will be modified in its application if it does seriously affect management in its effort to give steady employment.

Solution of the problem of steady employment is in the hands of *management*. If it is not solved satisfactorily and promptly, I am afraid it may be taken out of our hands.

A Low-Cost Factory Building

With no cut-to-fit joints and using a unique erection procedure, an all-steel-and-glass building is constructed at a saving of two thirds the cost of an equivalent structure of conventional design

■ RECENTLY a manufacturer desired to build a simple steel frame building at lowest possible cost. Cooperation with a welding engineer produced the rather unusual simplified design described and illustrated here.

To obtain lowest possible erection cost, the building was designed to eliminate cutting and fitting of joints in the field. Standard structural shapes were used exclusively. This plant, 100 x 320 feet, was actually built at one-third the cost of an equivalent conventional structure. No bolting or temporary fastening methods were necessary in the erection of this building. Welding was employed exclusively not only as method of holding in place during erection but in final joining of the members as well. Actual erection proceeded in the following sequence:

When the concrete reinforced floor was laid in position, stub beams were inserted in the concrete floor on 20-foot centers throughout the entire building as shown in Fig. 2. The vertical members of the building framework then were erected upon these stub sections after the concrete had hardened. Method of erecting the vertical members was simplicity itself. Starting at one corner the first vertical beam was placed on top of the stub and aligned vertically. Then it was welded to the stub member, holding it securely in position.

The first adjacent member, 20 feet away on the same side of the building, then was placed on its stub, aligned with the first member and welded. Horizontal member connecting the tops of these two beams next was set on top of them, aligned to the horizontal and securely welded. Proceeding in this fashion, each vertical member was tied in with the other vertical members by horizontal sections as erection proceeded. Surveyors instruments were used for accurate alignment of the beams during erection.

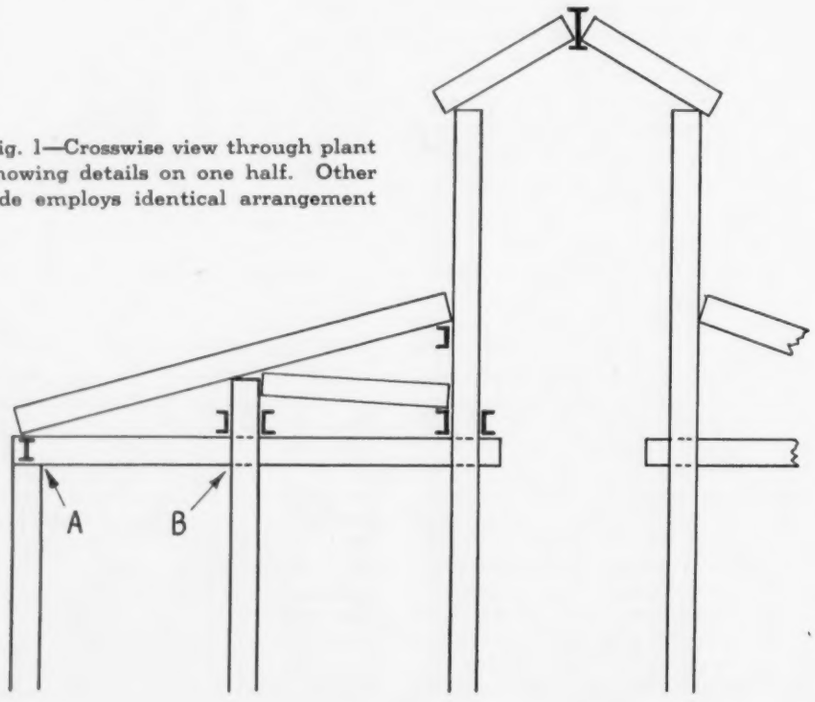


Fig. 1—Crosswise view through plant showing details on one half. Other side employs identical arrangement

Plenty of Daylight

Fig. 1 shows the arrangement of vertical and cross members throughout a cross-wise section of this plant. As will be seen, the building consists of a one-story structure using a sloping roof with a raised section of roof over the center bay. Windows extend the entire length of the plant on each side of center bay between the upper and lower sections of roof. As side walls also consist entirely of glass window sections, daylight working conditions are exceptionally good.

All joints where beams come together are made by simply overlapping the sections as detailed in Figs. 3 and 4. This eliminated necessity of cutting and fitting parts during erection and greatly reduced the cost of the building construction. Fig. 3 is an enlarged view of joint at point B in Fig. 1 to show more clearly the simple construction involved. In Fig. 3, A is the vertical column

supporting the horizontal members. Item B is the cross piece extending crosswise the building and fastened to the vertical member A by fillet welds in the corners as indicated by point C. The horizontal channels D extending lengthwise the building to join the vertical columns are located one on each side of the vertical column with their lower flanges resting on the cross piece B. These are welded to the vertical member by beads at points marked E and F.

Drilling and bolting during fabrication were eliminated by simply tack welding these parts in position and then completing the weld after checking for alignment. This also decreased the cost of erection by eliminating necessity of drilling bolt holes in the channels or using clamps and speeded up operations as well.

Fig. 4 is an enlarged view of the joint at point A on Fig. 1 where the cross members join the vertical columns on the outside wall of the building. In Fig. 4, A is at top of the vertical column and B is the horizontal member extending crosswise the building and is the same piece shown as item B in Fig. 3. This simply rests on the square top of the column to which it is fastened by welds at points D. The horizontal members extending lengthwise of the building are shown as item C in Fig. 4. These butt into the sides of the piece B, resting on the lower flange of this member and welded to it by beads at points E on this diagram.

Roof Welded to Framework

In a manner quite similar to the two detailed sections shown, the other types of joints were made up including the sloping roof supporting members and the bracing members shown in Fig. 1. Roofs are corrugated sheets tack welded to a light cross framework fastened to the sloping beams of the main structure.

Side walls utilize standard steel frame-and-glass assembled sections which are welded between the vertical supporting columns.

The construction described here resulted in a number of economies. The design was so simple that the work was done by men who had had no previous experience in building construction. These welding operators encountered no difficulty

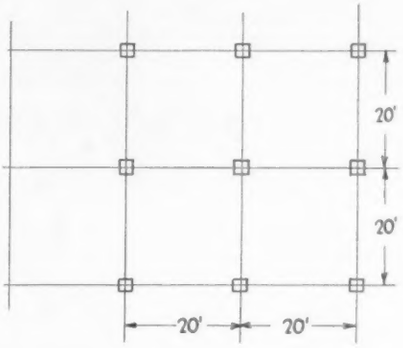


Fig. 2—This shows arrangement of supporting stubs set in the concrete floor

whatever in erection of this building. The fact that standard U-channels, I-beams and L-sections were used without necessity of special sections or special cutting to fit at joints made possible significant savings in material costs. The building itself has been in use a sufficient length of time to demonstrate that this design not only is economical but that it produces a building of sufficient strength for all practical purposes.

A further advantage that is expected to prove of considerable importance is the fact that this design greatly facilitates remodeling the building to meet expansion requirements, changes in fabricating methods or plant layout. Recently it was desired to widen out a portion of the plant so one of the outside walls was simply moved over 16 feet to give additional space desired. This was accomplished with surprising ease, low cost and high speed. A crew of two men handled the job easily.

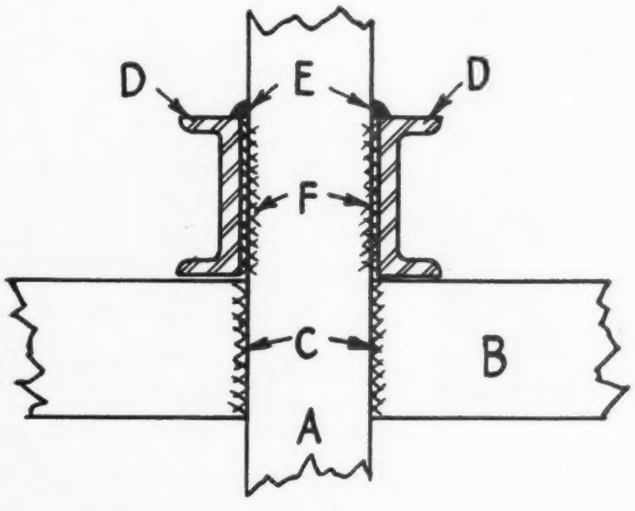
The steel frame sections holding the glass panes were cut loose from the vertical beams and swung out with a hand hoist to the new position desired where additional vertical supporting members had been placed to receive them. These vertical beams were anchored into concrete at their base and fastened to th framework of the main building by horizontal members to which they were welded. Two men easily moved the first 20-foot section of wall in 7½ hours.

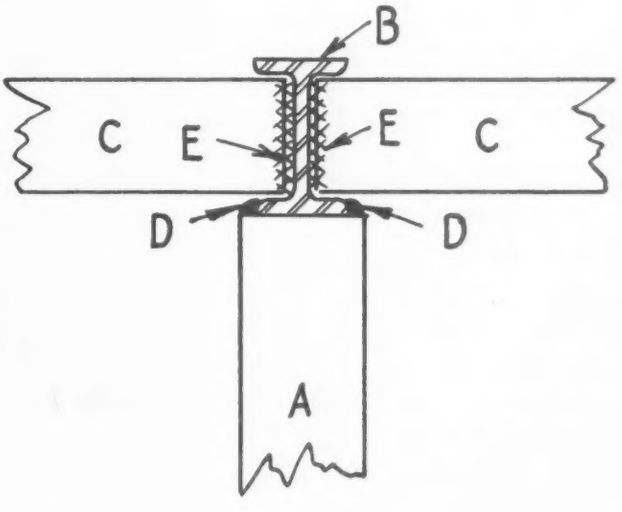
After experience with this first section succeeding sections moved at a faster pace, the last few sections being cut loose from the old wall, moved to their new position and welded in place in about 4½ hours time per section. This entire job was handled by the regular plant maintenance men at low cost and with no difficulty whatever.

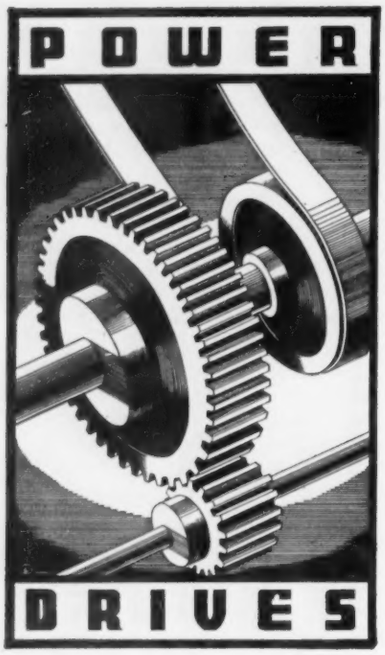
Strength is Adequate

Any question as to the strength of this frame construction is entirely without basis as many machine drives and considerable handling and conveying equipment are also fastened to the building framework and have shown no excessive vibration or any other signs of inadequate support. It is expected that this type of construction will be followed on any future building requirements at this plant. The building described here was designed and erected by R. D. Eaglesfield, welding engineer and manufacturer, Indianapolis, Ind.

Fig. 3. (Left)—Details of joint at A in Fig. 1. This indicates how beams are arranged looking at the side of the building. Fig. 4. (Right)—Closeup at point B in Fig. 1 showing details of joint







Maintaining Motors

Some users of industrial electric motors obtain almost phenomenal life from them. An authority here discloses the simple precautions that make such long life possible

By J. L. BROWN

Industrial Motor Engineering
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

■ PROPER maintenance enables correctly installed motors to give good service for an indefinite period. The precautions necessary sometimes appear so elementary that they are regarded as unimportant. However careful attention to these small details is the thing that lengthens motor life almost miraculously.

Atmospheric dirt, oil, carbon dust from brushes, etc. should be kept wiped off especially from bearing housings, windings, commutators and other exposed, live metal surfaces, dirt in the motor being blown out with dry compressed air. Oil soaked windings should be disassembled and washed with a solvent, preferably carbon-tetrachloride, thoroughly dried and coated with an air-drying insulating varnish. Since some solvents are highly inflammable and others are toxic, they must be used only in well ventilated locations.

Clear Air Passages

Totally enclosed, fan cooled motors have ventilation passages for external air that must be kept clear to prevent overheating. In some designs these passages are not self-cleaning and form a sort of dust trap which will clog rapidly with atmospheric dirt. In a few cases it is necessary to remove outer covering to dislodge accumulated dust.

When coils become loose they should be tightened by wedging, cording, or clamping to prevent chafing and abrasion of insulation at points of contact with supporting metal parts. This avoids possible breakdown. Abuse of windings should be avoided especially with older motors, as insulation becomes dry and brittle and may crack open. If this has occurred but actual grounding or shorting has not taken place, bruised parts may be covered with air drying varnish after any actual breaks in the insulation have been repaired with insulating tape.

Where windings have suffered no mechanical damage, effectiveness of insulation may become poor from various causes. It will pay to check insulation resistance at intervals. Using a megohmeter, or megger, it is necessary only to disconnect motor and connect the tester to motor leads and to motor frame. Readings will vary depending upon temperature of motor windings, etc. at the moment of taking the measurement. Thus while windings at temperature of 50 degrees Cent. may read one-half megohm, a satisfactory condition, at that temperature such a reading would indicate a questionable condition at 20 degrees Cent.

Oiling is one step in the effective maintenance plan

Low insulation resistance may be due to defective conditions at isolated points such as where the leads are held in a clamp, or they may be due to a general condition such as presence of moisture or conducting dust.

True Conducting Surfaces

It is important to keep current conducting surfaces of commutators and collector rings smooth and true. In handling during disassembly, protect these parts by a wrapping of heavy cardboard or fishpaper well secured in place. For removing minor roughnesses fine sandpaper may be used but truing up should be done in a lathe. Even minor defects will result in unsatisfactory brush operation. Especially with high current densities, severe burning of surfaces may be expected if the defect is not removed. Turning a commutator with mica between bars necessitates restoring the original depth of undercutting. If not done, mica not wearing at same rate as the copper bars soon results in poor commutation.

Accumulation of dirt and corrosion interferes with free operation of brushes in brush holders with resultant burning of commutators or collectors. Check for proper action of these important parts. Brush holder springs and fingers should move freely and exert pressure on

approximate center of outer end of brush without binding. These parts may ordinarily be bent to correct their relation with the brushes if proper adjustment has been lost.

When brushes are renewed, carefully fit the new ones. Surface making contact with commutator or collector comes flat in a new brush and must be made to fit curvature of part it engages. To do this, new brush is placed in normal position in the holder, a piece of fine sandpaper inserted between brush and commutator or collector with rough surface against brush and smooth surface following desired contour. Drawing sandpaper back and forth quickly forms desired curvature.

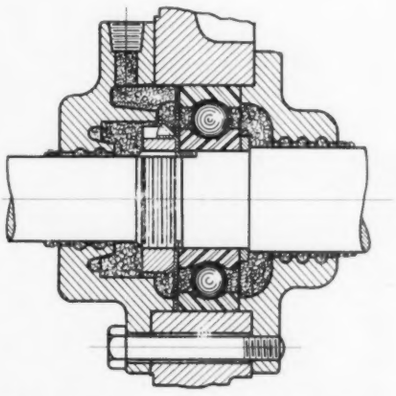
Proper brush pressure varies. Two pounds per square inch of contact area is considered good average pressure for ordinary industrial motors. For copper-graphite brushes commonly used on collector rings, four pounds per square inch is usually satisfactory.

Bearing Lubrication Important

Proper lubrication of bearings is particularly important since improper practice results in damage not only to bearings but to insulation as well. Some bearings may require less lubrication or less addition of lubricant than others, but with industrial electric motors failure of lubrication is tantamount to failure of bearings. This is so well appreciated that most bearings are copiously lubricated, frequently resulting in damage to motor insulation or even to bearings themselves.

Most plain or sleeve bearings of electric motors are oil lubricated and are provided with a gage projecting from the bearing housing through which all oiling is done. Position of top surface of gage is correct oil level.

When an oil ring hanging on shaft carries oil from bearing reservoir, overfilling reservoir beyond proper level serves no useful purpose and introduces the danger of oil traveling out along shaft into the motor.



This bearing is too full of grease. Overfilling causes overheating of bearing with disintegration of lubricant

Periodic cleaning prevents accumulation of dust and dirt. It also avoids possibility of material getting inside to damage windings

If oil level is correct and bearing is not getting sufficient oil, look for improper rotation of oil ring due to being out of round, dragging on the surface of some stationary part, or dragging from excessively heavy oil. Bearing may show signs of distress even though receiving a normal quantity of oil. Polluted oil may carry dirt into it. Improper alignment or a heavy belt pull may cause excessive shaft deflection and metal to metal friction between shaft and bearing surface.

Occasionally incorrect bearing design may cause trouble. Bearing area may be insufficient to carry the load. Oil grooving may be such that with a given direction of belt pull the oil will not feed in between the bearing and journal.

Although frequent lubrication inspection is desirable, properly designed bearings and housings need addition of oil no more than once or twice a year. A bearing showing rapid loss of oil should be investigated and corrected either by replacement of seals, modification of bearing housings or replacement of complete motor bracket.

For industrial motor sleeve or ball bearings using oil, a good quality lubricating oil having a viscosity of about 200 saybolt seconds at 40 degrees Cent. is satisfactory. Oils should be free from sediment and should not sludge or gum under temperatures as high as 80 degrees Cent.

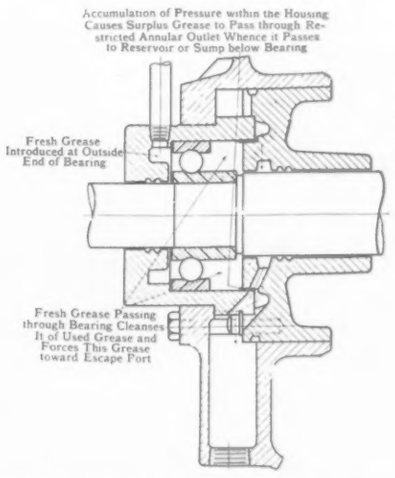
Checking oil level especially in the case of motors mounted on the ceiling or in other place hard to reach is made easier by use of automatic constant-level sight oilers. These devices have a bottle which supplies oil in addition to that in the bearing reservoir and which replenishes bearing reservoir automatically to maintain correct oil level. Presence of any oil in the bottle indicates bearing requires no addition of oil. All oiling is done by refilling the bottle, no oil being added directly to bearing.

Ball bearing motors that are oil lubricated can usually be distinguished from grease lubricated motors by the presence of oil cups or sight oil gages. In oil lubricated ball bearing motors it is particularly important that oil cup or gage indicating correct oil level be kept quite full. Even when cup is not entirely empty, oil may not be reaching rolling members. Oil level must be high enough to flow over lowest part of inner diameter of outer bearing race. At the same time avoid overoiling which would damage insulation.

Most ball bearing motors, however, are arranged for grease lubrication. Grease is no less harmful to motor insulation than free oil. Therefore avoid using a surplus of grease which may be forced out or escape from the bearing housing into the motor. An excess of grease, filling a bearing housing with no escape port, also causes overheating. Although this may not injure the bearing directly, it may cause deterioration of the grease itself, this in turn often destroying the bearing.

Removing Grease Residue

When grease deterioration has proceeded beyond early stages, solvents such as benzene or kerosene will not remove all old grease but will leave a hard flaky residue which has no lubricating value and which will rapidly destroy the bearing. To remove this residue, wash the bearing in a 15 per cent caustic solution until thoroughly clean but in as short a time as possible. Now rinse thoroughly in boiling water, flush with kerosene then with oil. Bearing


Accumulation of Pressure within the Housing Causes Surplus Grease to Pass through Restricted Annular Outlet Whence it Passes to Reservoir or Sump below Bearing
Fresh Grease Introduced at Outside End of Bearing
Fresh Grease Passing through Bearing Cleanses It of Used Grease and Forces This Grease toward Escape Port

Design of bearing in which the addition of fresh grease forces used grease through an escape port into a reservoir below

Table I

Suggested Greasings at Three-Month Intervals

Shaft Extension Diameter Inches	Weight of Grease to be added Ounces
¾ to 1¼	¾
1¼ to 1⅞	1
1⅞ to 2⅝	2
2⅝ and over	3

Note: 1 ounce = 1¼ cubic inches.

now is ready for further use unless worn or otherwise damaged.

For ball bearings whose housings are not provided with a means of discharging surplus grease during operation, a greasing practice generally satisfactory is to add a small amount of grease at two or three-month intervals; then disassemble the bearing housings for a thorough cleansing at end of one or two years. If amount of grease added has been correct, bearing will have had sufficient grease throughout the period and overfilling will have been avoided. At clean-out all old grease is removed, bearing is supplied with a small initial charge and the one or two-year cycle repeated. Table I suggests quantities for grease additions at three-month intervals in continuous service.

To increase the time between overhauls or eliminate them altogether and at the same time insure the bearing against damage from deteriorated grease, a ball bearing housing has been produced which provides for automatically disposing of surplus grease. New grease is introduced at the side of the bearing farthest from the body of the motor. An ample charge will fill the outer space and work its way in among rolling members, gradually forcing old grease through a partially restricted escape port. In this design generous greasing and removal of discharged surplus grease should make bearing overhaul rarely necessary.

Generation of heat in a bearing is dependent upon three things: Weight supported, velocity at point of support, coefficient of friction. In any given machine the weight can hardly be changed. Velocity is difficult to change because number of revolutions per minute is fixed and journal diameter is governed largely by shaft strength requirements. Coefficient of friction is subject to wide fluctuations and is the element usually worked upon to reduce amount of heat generated in a particular bearing.

When it takes four pounds rotational force applied at the periphery of the journal surface to rotate a journal carrying a total weight of ten pounds, 0.4 is said to be the coefficient of friction, an approximate value for dry sliding friction.

A plain bearing starting from rest has lost most of the oil film normally separating journal from bearing so only a slight oiliness remains, so coefficient of friction at starting will vary from 0.25 to 0.10. When journal begins to rotate and lubricant is drown in, coegicient of friction drops to a lower figure, possibly 0.04. If lubrication is ideal, it will drop to 0.004 or under special conditions as low as 0.002. Thus for minimum heat there should be complete absence of any metal to metal rubbing between journal and bearing on the one hand and adequate lubrication on the other.

Proper clearance on motor bearings is essential to insure satisfactory life

In the case of ball or roller bearings supporting a horizontal shaft, starting and running friction will not be greatly different from each other and may vary from 0.01 to as low as 0.002. Taking all factors into consideration, generation of heat in bearings of industrial motors is not greatly different whether ball bearings or plain bearings are used there is, however, a distinct advantage in favor of ball bearings when starting.

Because temperature rise of one bearing is greater than another is not necessarily an indication of any trouble in the bearing; it may simply indicate that the bearing housing is small, thus limiting the radiating area, or that the air circulating around the bearing housing is less than in some other cases. Any bearing whether plain or ball may safely operate at a temperature much higher than can be borne by the hand. At the same time the temperature rise of a bearing is one of the most useful means of checking its condition. Use a thermometer in all cases and measure temperature of the surrounding air so actual temperature rise may be determined.

Normal temperature rise for a small bearing running at a low speed will obviously be much less than a large bearing running at high speed (all other things being equal) so one figure can be set as a limit for all cases. Tables II and III give expected temperature rise of well ventilated bearings for industrial motors. This may serve as a guide to indicate presence of some abnormal condition contributing to heating. In motors having collectors and commutators, the bearing ad-

(*Please turn to Page* 59)

Table II

Expected Temperature Rise of Well-Ventilated Sleeve Bearings for Industrial Motors, Degrees Centigrade

Shaft Diameter Inches	Speed—Revolutions Per Minute 900	1200	1500	1800	3600
1 to 1.75	15	15	15	20	25
Above 1.75 to 2	15	15	20	20	25
Above 2 to 2.25	15	20	25	25	30
Above 2.25 to 2.5	20	20	25	25	30
Above 2.5 to 3	20	25	30	30	35
Above 3 to 4	25	25	30	35	..

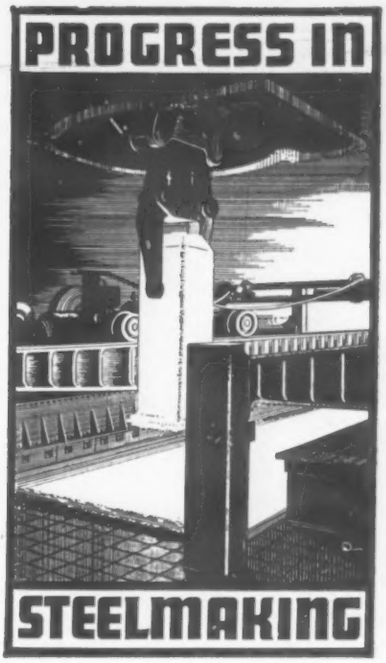
Temperatures measured by thermometer on outside of bearing housing.

Table III

Expected Temperature Rise of Well-Ventilated Ball Bearings for Industrial Motors, Degrees Centigrade

Approx. Inside Diameter of Bearing In Inches	Speed—Revolutions Per Minute 900 S.R.	900 D.R.	1200 S.R.	1200 D.R.	1500 S.R.	1500 D.R.	1800 S.R.	1800 D.R.	3600 S.R.	3600 D.R.
1–3/16	10	10	10	10	10	15	15	20	20	20
1–3/8	10	10	10	15	15	15	15	20	20	20
2–3/4	10	15	15	15	15	20	15	20	20	20
2	10	15	15	15	15	20	20	25	25	25
2–3/16	15	15	15	20	15	25	20	30	25	35
2–9/16	15	20	15	25	20	25	20	20	30	40
2–15/16	15	20	20	25	25	30	25	30	30	40
3–9/16	20	25	25	30	25	30	30	35	..	..
3–15/16	20	25	25	30	30	35	30	40	..	..

S. R. means Single Row ball bearings.
D. R. refers to Double Row ball bearings.



Rolling Mill Trends

Two and three-zone continuous heating furnaces, more rapid machinery, better bearings, more frequent roll changes combine to reduce rolling mill tolerances

By QUINCY BENT
Vice President
Bethlehem Steel Co.
Bethlehem, Pa.

■ INGOT HEATING today has been reduced to a definite science both as to proper temperature of internal structure and plasticity for rolling as well as to atmosphere for the control of scaling and decarburization. The best fuel generally is a combination of blast furnace and coke oven gas of about 125 B.t.u. This gives a soft flame of good heating value and permits fast working pits with minimum damage to the steel.

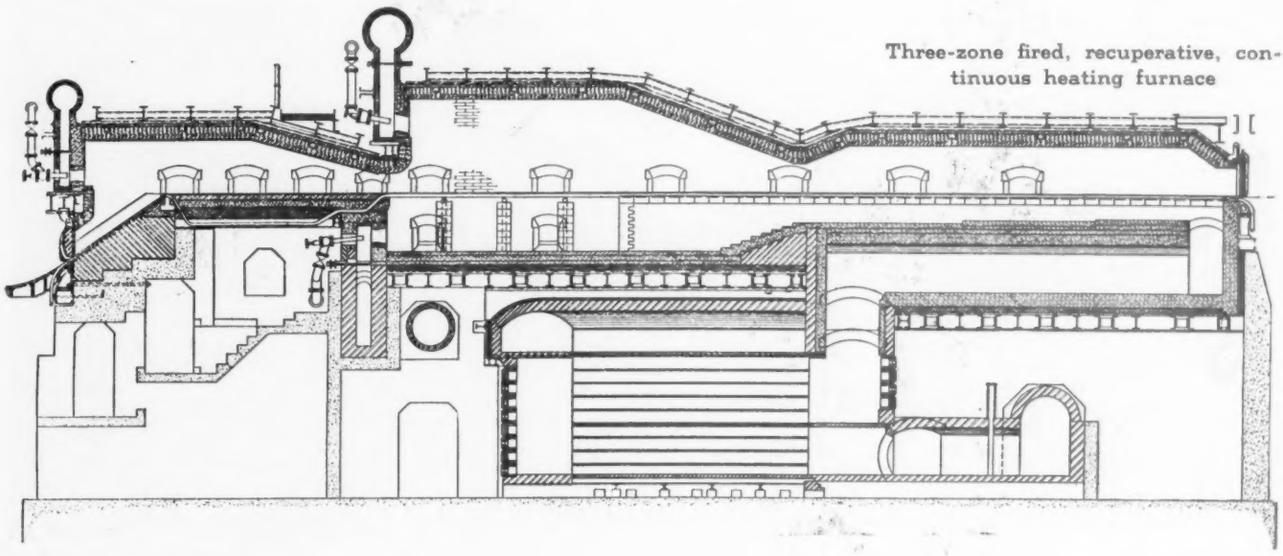
Best heating practice is accomplished in the pit where the steel being hotter in the center permits an easier equalization of temperature than is practical where cold steel is heated and where all the heat must be driven from the surface to the center of the section.

Before entering the finishing-mill reheating furnace, semifinished steel is usually subjected to surface inspection, chipping, often chipping and pickling, or flame scarfing, planer chipping and grinding. The extent of this preparation may depend on several factors. First is the cause of the defect, whether it be of steel quality or mill defect. Then there is a question as to the justifiable cost of such preparation in relation to the resulting salvage value. On the more expensive alloy steels where a perfect surface is required, a preparation cost of five or six dollars per ton may be warranted whereas in the more ordinary grades of steel not more than 50 cents to one dollar can be absorbed.

There are even times when inspection of semifinished material will disclose necessity for rejecting the whole heat of steel and diverting it, if possible, into some other product. When working to particularly close metallurgical limits where whole heats may occasionally be set aside, the question of misfit heats becomes a problem particularly in special chemical ranges where there is little opportunity for application on another order. It is excellent practice for a plant manager to review frequently his stock of misfits. Otherwise an excessive stock of unusable steel may be built up.

In rolling, narrower ranges of tolerance may be obtained by frequent section gaging both by the roller and the hot bed inspector. Variations run up the cost of finishing and cause irregularity in results when working in dies, either hot or

Abstract from paper presented at (British) Iron and Steel institute meeting, London, England, Oct. 26, 1938.



Three-zone fired, recuperative, continuous heating furnace

cold. The market for rolled products is gradually forcing production of almost a machine finish. This means more rapid machinery, better bearings, more frequent roll changes and constant intelligent supervision of every detail of rolling processes.

Mill bearings have advanced far in reducing need for frequent bearing renewals, in saving lubricants and power, as well as giving greater accuracy of section. Such advances include pressure oil bearings, roller bearings and special composition bearings, particularly the nonmetal bearings beginning with wood lignum vitae and now bakelite resin composition.

In the plate mills recent progress has included improvements in hearth heating furnaces, electrical and mechanical details, hot bed straightening for camber and easy, efficient handling of the product.

One of the notable trends appears in the possibility of strip steel, cold formed or welded or both, in replacing hot rolled steel sections. Where contours, weight and effective distribution of metal are important, there may be a substantial substitution of these cold formed products in the lighter sections. This trend may not mean simply a transfer of tonnage from one mill to another but may result in an increase in the general use of steel, permitting it to take the place of materials other than steel in building construction and similar applications.

In bar mills there appears to be a trend toward single purpose or special mill with more mills to cover the complete bar range. Thus a number of mills in one group with their size ranges overlapping are found rather than the more cumbersome general purpose mill covering many sizes.

An interesting appliance used with bar mills is the photoelectric cell for automatically closing guides, switching and shear operation. A wider application of this device, because of its accuracy and positive action, may be expected.

Latest rod mills are designed for 4-strand operation rather than 2-strand and with separate finishing stands and coil delivery, and with speeds up to 4000 feet per minute. Special bearings are generally used, and the trend is toward individual motor drive rather than group gear drive. Theoretically, there is no reason why a modern mill should not roll up to the capacity of the heating furnace—20,000 to 25,000 tons of rods per month.

In sheet and tin mills, the field for continuous rolling is gradually broadening as knowledge and experience with it increases. Use of the breakdown strip instead of the sheet bear has improved both costs and quality of the hand-mill product. Although there has been a substantial gain in heating and rolling efficiency and economy, there appears little to encourage development or modification of these hand mills. Nevertheless there is and will continue to be a justifiable place for the hand sheet and tin mill.

Good practice today works towards the elimination of extended delays in roll changing. This means use of spare housings, making the roll and guide setup on separate shoes away from the rolling train, removing and replacing entire mill housings and rolls by a spare set which has been separately assembled for the new section. This of course involves extra housings, but most important is a special crane service for roll changing capable of lifting up to 150 tons in some instances. Even on the largest mills, complete roll changes may be accomplished in 1½ hours where under old conditions the change might take 4 to 5 hours.

This is an example of the effort to maintain high tonnages to pay off large capital investments. Tonnage of salable product determines profit or loss, and when the tons are multiplied by a saving in cost of 50 cents to $1.00 per ton at anywhere near the unit's capacity, such expenditures are easily justified.

Belt Conveyor For Cold Mill

■ COMBINATION cold strip and sheet mill at one of the country's newest steel plants, as shown in the accompanying illustration, is served by belt conveyors with adjustable guards, designed to handle sheets varying in width from 30 to 94 inches.

Middle belt of this triple conveyor, built by Logan Co., Louisville, Ky., is stationary and is located on center line of the mill. Each of the outer belts is integral with its guard rail and is adjustable laterally through right and left hand screws by means of the handwheel visible in both views. Head pulleys of outer belts are mounted on splined shafts. Sheets are fed manually from the pack tilter shown at right of the belt conveyor.

Lifting rings at corners of the conveyor permit moving it bodily out of the way when it is desired to feed coiled strip to the mill. Coils are deposited by crane on the roller conveyor shown in foreground of view at the right. Roller conveyor delivers to a combination down and side tilter, from which coils roll off to skids leading to the uncoiler.

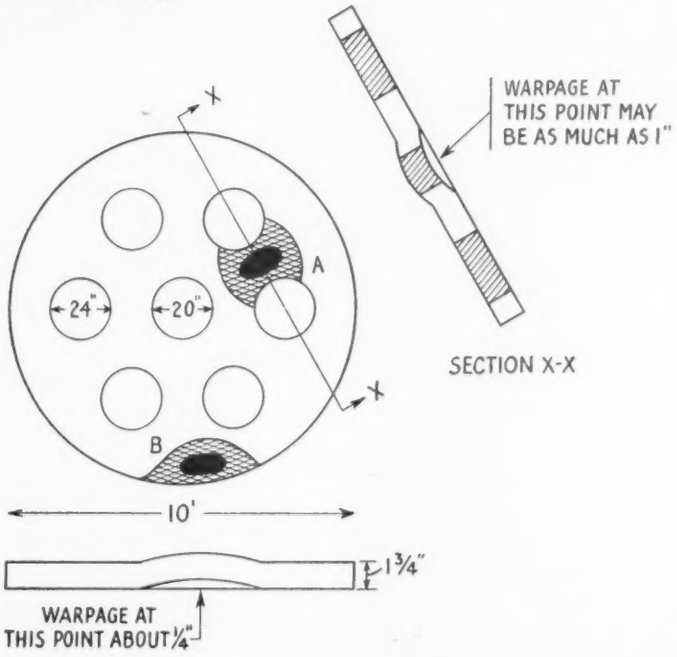
At left, belt conveyor with adjustable guards is shown feeding steel sheets to the cold mill. At right is seen conveyor arrangement for handling coiled strip at the same mill

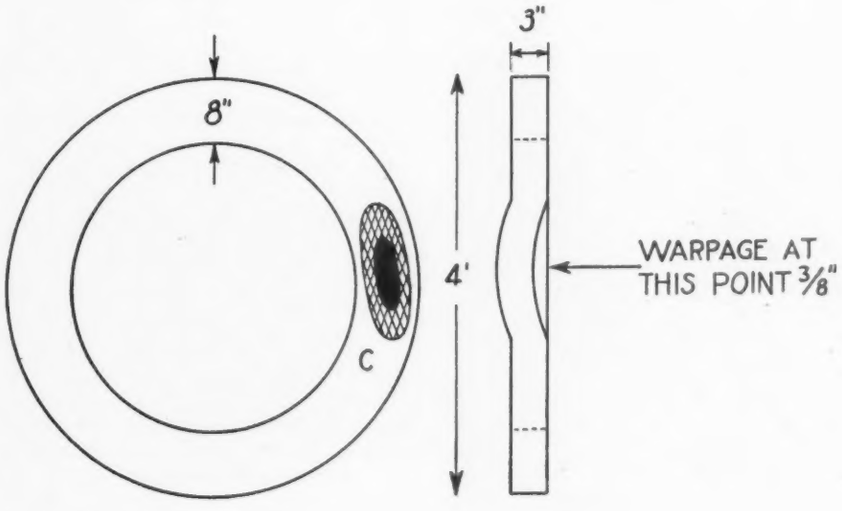
Torch Removes Bulges in Steel Plate and Castings

■ EFFECTS of expansion and contraction in welding or cutting with an oxyacetylene flame are well known. Methods have been developed to control and direct these effects, and to correct them should warpage and distortion result. The following examples of how warpage can be overcome by subsequent heating appeared in *Oxy-Acetylene Tips*, published by The Linde Air Products Co., New York. They are typical of the many instances where a flame can be used effectively to bring a piece back to its original shape.

In Fig. 1 is shown a circular plate 1¾ inches thick and 10 feet in diameter. It has seven circular openings formed entirely by flame cutting. It was found that some warpage invariably occurred, either at some point along the edge or in the body between two of the openings. In the specific case illustrated, distortion in the form of high spots or bulges occurred at both points A and B. At A the plates buckled to a height of about 1 inch, while at B the edge curled until it was about ¼-inch out of line. The double cross-hatched areas indicate the limits of the warped material.

Fig. 1. (Top)—Warpage at A and B was overcome by heating the dark spots in the cross-hatched areas. Fig. 2. (Below)—A torch quickly corrected distortion at point C in this cast steel ring





To straighten the piece, the two warped places were heated to a temperature of about 800 degrees Fahr. using two blowpipes at highest points indicated by dark areas. Then they were cooled rapidly with compressed air at 80 pounds per square inch from two ¼-inch hoses. Section A returned about ½-inch towards flatness after one treatment. It therefore was heated and cooled twice to complete the operation. Warpage at B was corrected by similar treatment with only one heating.

When these parts were straightened in a press, 32 man-hours were required for each plate. Using the torch three plates were straightened in 2 hours and maximum variation after treatment was 1/16-inch, all of which was removed by subsequent machining. It was at first thought that some strains might have been set up by the heating operation which would be relieved by machining, but such was not the case.

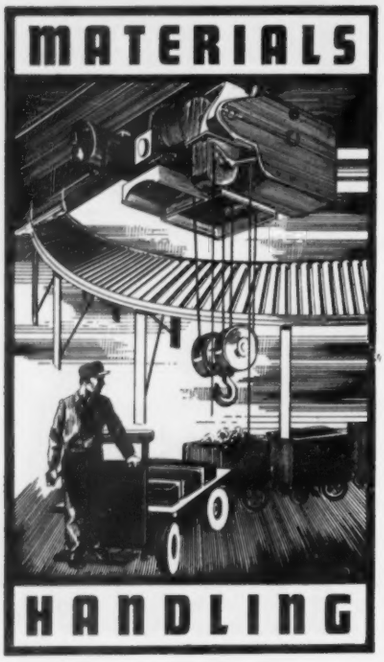
Fig. 2 illustrates how blowpipe straightening can be employed to correct distortion resulting from procedures other than flame cutting. This application was developed in the same plant. The ring shown is an alloy steel casting that formerly required 16 man-hours to straighten in a press. It was also stress-relieved in a furnace where each ring had to be well weighed down to prevent further distortion.

During a period when the presses were overloaded with this work, the torch was tried and found to accomplish a more satisfactory job in 4 hours. Although stress relieving in a furnace was also necessary after oxyacetylene straightening, it was found much easier to keep the piece straight. This particular casting was out of line about ⅜-inch and was brought back to within 1/16-inch of being true.

New Die Steel Is Tough

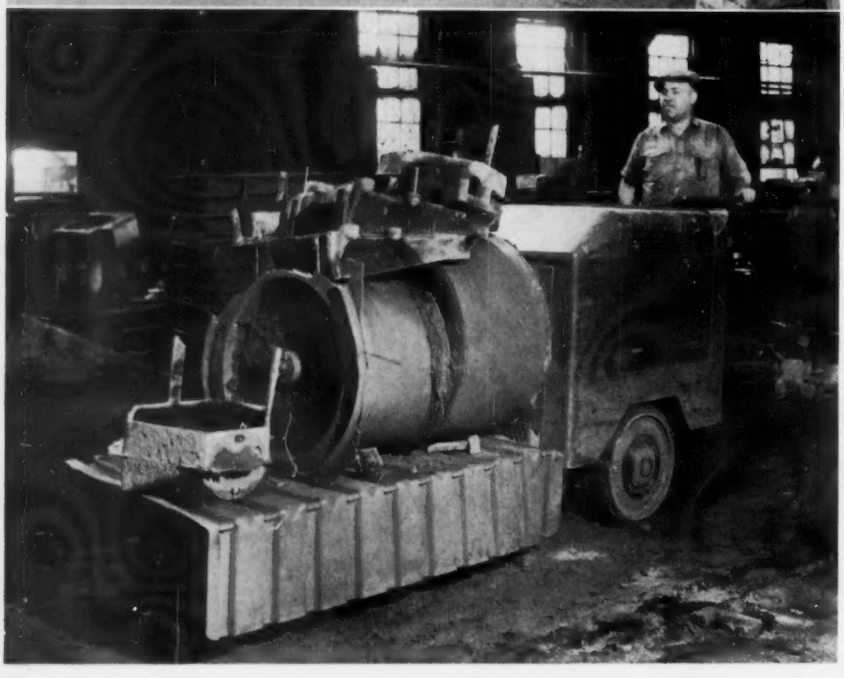
■ An air hardening chromium molybdenum vanadium die steel, said to combine air hardening characteristics with non-deforming properties, has been developed by Crucible Steel Co. of America, 405 Lexington avenue, New York. Known as Air-kool, this die steel is recommended for applications in which toughness is one of the principal requisites, such as blanking dies, forming dies, trimming dies, drawing dies and punches.

It is claimed this new steel machines easier than high carbon high chromium steel, is tougher than oil hardening steel and has a wide hardening range.



Handling Melts

Lift trucks charge annealing furnaces and deliver castings to finishing department. Also carry molten metal from cupola to crane area and to distant parts of foundry floor



By GEO. E. STRINGFELLOW

Vice Pres. and Div. Manager
Edison Storage Battery Division
Thomas A. Edison Inc.
West Orange, N. J.

■ SOME TIME ago, Sacks-Barlow Foundries Inc., Newark, N. J., producers of steel, gray iron and malleable castings for metropolitan New York, adopted a battery industrial truck for charging annealing furnaces in its malleable casting department.

By handling the annealing boxes in units of five and placing them in position more quickly and more accurately than had been possible before, the truck immediately made a substantial saving in time.

Replaced Hand Truck

Formerly the job had been done by a hand truck especially built for the purpose in the company's own shops. At one end was a fork to engage the platform on which the boxes were stacked, and at the other an extension handle to give the necessary leverage to lift the load off the floor.

But a stack of five annealing boxes weighs approximately 2 tons, so even with the special truck the job was slow. To put 33 such stacks into the furnace or to remove them required a considerable length of time. The battery industrial truck,

Fig. 1. (Top)—Original truck used to charge annealing furnaces. Fig. 2. (Below)—Castings are put on skids when removed from molds and taken without rehandling to the grinding department

TOO HOT TO HANDLE?

No Sir! **This Industrial Giant Coolly and Competently Handles the Hottest of Foundry Tasks**

IN the larger illustration, a furnace charging truck is shown. Twelve years ago this truck commenced its chore of time saving and money saving for a century-old foundry. It did such a good job that another truck (employing the same time saving and money saving methods) was put to work to speed up movement of metal from cupola to mold, of castings from foundry floor to finishing department and for other jobs with attendant economies and attendant man-safety.

Fitting indeed was the selection of a storage battery to power that first lift truck. It was a steel storage battery, an Edison. It delivered 11 years of service before renewal was necessary.

See the industrial giants at work in the new Edison film on material handling. Just reach for the telephone and call the Edison man for a showing at your convenience.

EDISON

STORAGE BATTERY

DIVISION OF THOMAS A. EDISON, INC. WEST ORANGE, NEW JERSEY, U.S.A.

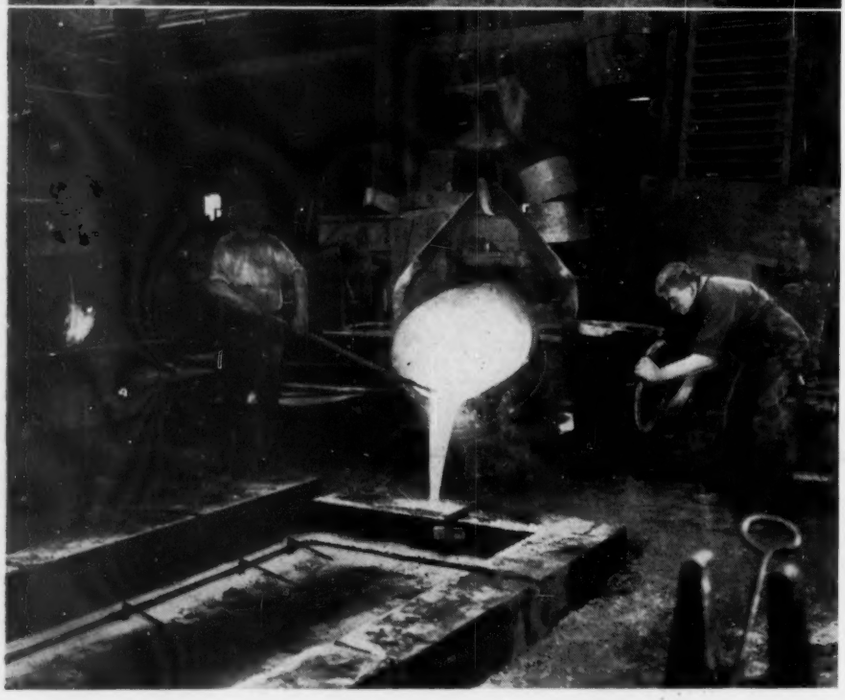


Fig. 3. (Top)—At cupola, 3000-pound ladle on skid is picked up by lift truck. Fig. 4. (Center)—Truck brings ladle within reach of overhead crane. Fig. 5. (Bottom)—Crane then handles ladle to the molds for pouring

Fig. 1, now handles this entire job in 1½ hours.

Although the truck was adopted primarily for use in furnace charging, it served also to facilitate movement of castings from the grinding department to the annealing room. The improved handling plan was found excellent mechanically and electrically. Original storage battery on this truck delivered 11 years of service before it had to be renewed.

This experience suggested to the management that a battery industrial truck might also solve a troublesome material handling problem in the steel and gray-iron foundry. Here the pouring of large castings required more metal than a floor molder could carry from the furnace in his hand ladle. Also metal needed to be supplied to the more distant parts of the foundry floor.

Metal from the cupola was transferred in a 3000-pound ladle mounted on a narrow-gage rail car which was pushed 150 feet by hand on a track running along the middle of the floor and then was picked up and poured by an overhead crane. With a new heat ready every 7 minutes, it was difficult to draw it and supply the molders at an equal pace.

Add Second Truck

A second low-lift battery industrial truck and a quantity of steel skid platforms were put into operation. Since then, there has never been the slightest difficulty in supplying metal to the most distant parts of the foundry floor. Nor has the liquid nature of the load itself proved to be a problem.

The ladles, kept on skid platforms, are simply picked up at the cupola and delivered to the overhead crane on the pouring floor or set down within its reach. The truck is able to make the 150-foot trip from the cupola to the crane department in 35 seconds, less than half the best time made by the narrow-gage hand rail car.

Adoption of the skid and lift-truck system of handling for this purpose was then extended to delivery of castings to the finishing department and from there to outgoing delivery. Formerly, castings were put on the foundry floor after removal from the molds and then picked up and set down twice while being hand-

(*Please turn to Page* 59)

A Co-ordinated Handling System

■ AT THE Memphis, Tenn., plant of Firestone Tire & Rubber Co., a very flexible system has been worked out to handle heavy tire molds. These are large one-piece steel castings. In operation they are used in pairs, one for each side or half of the tire. Automobile casings are made in these molds necessitating the cutting or sinking of the tread pattern into the steel casting. Quite a number of special machine tools are used for this work, some of which may be seen in the accompanying illustrations. As all of these castings are much too heavy to move about by hand, efficient materials handling equipment is most essential. Here are shown views of the interlocking monorail system employed to cover efficiently all operations incidental to preparation of these molds, through machining, dressing and testing. The system provides complete coverage of all shop areas through traveling monorail bridge sections which interlock into monorail lines between the various work areas. Photos courtesy American MonoRail Co., Cleveland.

Fig. 1. (Above)—Jib for unloading trucks and gondola cars interlocks with short crane bridge for dock storage. Crane bridge interlocks with spur track entering building

Fig. 3. (Above)—Trolley on the right with chain hoist brings load under craneway where it can be picked up by hoist on crane bridge shown in rear

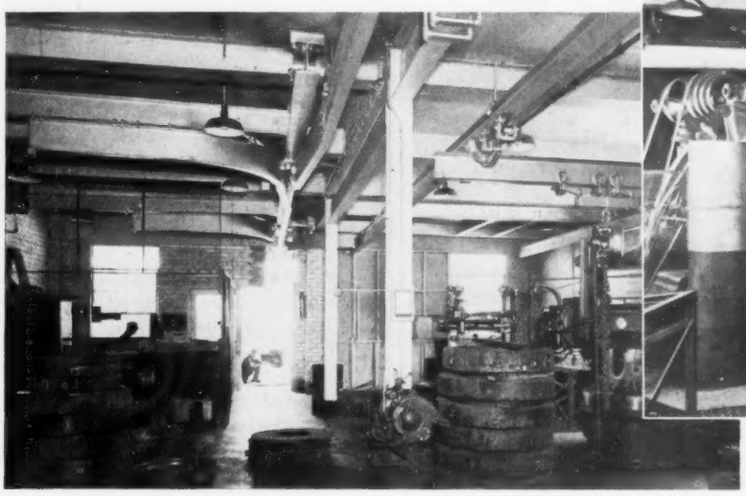
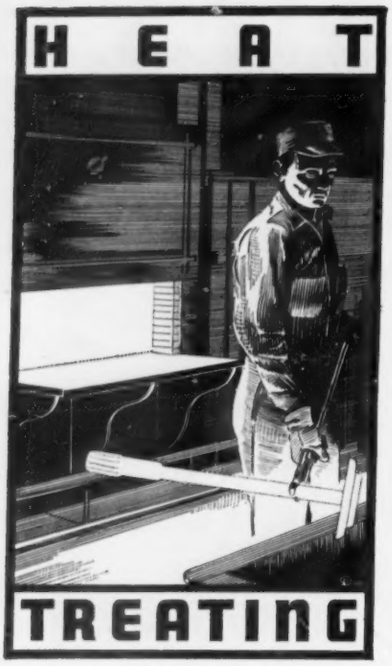


Fig. 2. (Above)—Track through door leading from unloading dock and branching over tool crib on one side and to craneway on other side with a 3-way switch. A 2-way switch provides a single spur where main line shunts off to serve one side of craneway

Fig. 5. (Below)—Two cranes in dressing and testing room at crossovers. Complete coverage of entire shop possible with this system

Fig. 4. (Below)—Crane at crossovers for passage of trolley unit to other crane in same room or to crane in dressing and testing room



Flexible Treating

Careful selection of equipment and layout planning effected economies in this plant where varying production and dissimilar products presented new heat-treating problems

By J. W. ANDERSON
Factory Manager
and
DAVID M. KILLION
Foreman
Heat-treating department
Schwitzer-Cummins Co.
Indianapolis

■ RECENT expansion at the plant of Schwitzer-Cummins Co., Indianapolis, greatly increased demands on the heat-treating department, which had become hemmed in by other departments. A new location was found where heat treating could be carried on without interfering with the flow of production. This move permitted better arrangement of heat-treating equipment as well as an increase in facilities.

Problems involved in selecting equipment and planning the shop layout were similar to those of many plants producing a wide variety of products. Schwitzer-Cummins Co. manufactures fans, water and oil pumps and superchargers for automobiles, hot-air heating furnaces, air conditioning equipment and stokers, as well as smaller items. Quantities produced vary widely, and steels of several different compositions are used. Customer requirements vary also. Each lot must be handled separately, therefore, and often on a rush basis. In addition, numerous castings are annealed. Carburizing is a continuous problem. These points had to be considered in selection and arrangement of equipment.

About 40 per cent of the work is carburized and practically all castings are annealed for machineability. To increase flexibility of equipment, all furnaces were designed for use in either annealing or carburizing. Department is provided also with quenching tanks, a tempering furnace and cyanide pots.

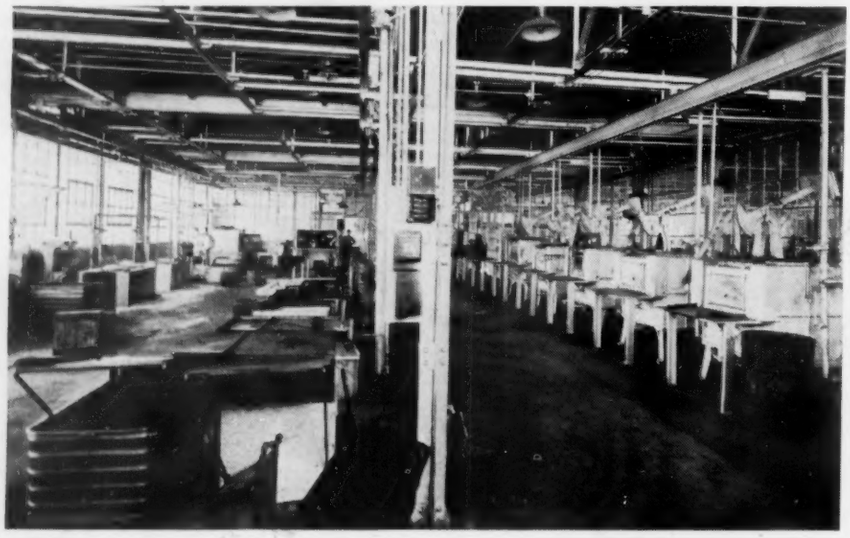
Work handled consists largely of fan spindles and spiders, pump shafts and gears and miscellaneous other light parts. Stoker shafts are the heaviest steel parts. These are heat treated to relieve forging stresses and obtain a hard surface which will stand abuse. Largest casting annealed is a stoker drive gear case which weighs approximately 70 pounds.

Most of the steel is SAE 1315 stock, but considerable SAE 1020 and SAE 1045 is used. Nearly all carburizing is to a standard case depth of 0.040-inch and is kept within 5 points of established Rockwell hardness specified for each part according to service.

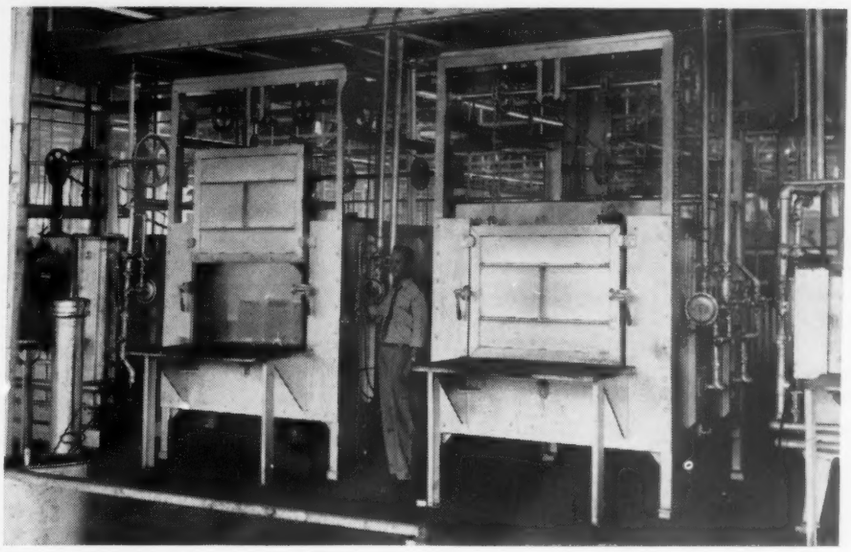
Compact Arrangement

Heat-treating department occupies a space 50 x 120 feet. In planning the layout, special consideration was given to selection and arrangement of equipment, facilities for handling and quenching and ventilation. Combination annealing and carburizing furnaces, all with controlled atmosphere, are set along one wall; tempering furnaces, cyanide pots and other special equipment are along opposite wall; quenching tank, cleaning, pickling and rustproofing equipment are near center, easily accessible from both sides.

Both bays are served by floor-op-



Heat-treating department, with carburizing and annealing furnaces at right, auxiliary equipment at left, and quenching tank and rust-proofing equipment at center



Two of the four large furnaces, which handle quantity work. Hearths are uniform in height to facilitate loading

erated electric hoists, running on monorails. The walls, even those separating heating-treating from other departments, are largely of glass.

In the new location furnaces were changed from fuel oil to gas with single-valve operation, and in some instances automatic temperature control was installed. Three men operate all furnaces on second and third shifts. On the day shift, when most of the heats are on, six men are required. From an operating standpoint it is as necessary that equipment be easily controlled as closely controlled.

Neutralize Flame

In annealing, the flame is neutralized with gas. This results in less scale and practically no spoilage. Through better control and maintenance of steady heat, production has been increased 20 per cent. Furnaces are fired underneath and vented through side flues and top of the arch. Stopping vent holes in arch permits building up a forced gas pressure.

Hearths on all 16 furnaces are of the same height for ease in loading and unloading, irrespective of furnace dimensions. Carburizing box packing tables are uniform in height so that boxes are pushed from packing table to a portable loading device for filling or emptying furnace.

Because of varying dimensions and quantities of work handled, furnaces are of several different sizes. The two largest furnaces measure 40 x 60 inches inside with 30-inch arches, and hold 6 boxes each 24 inches in diameter by 24 inches high. Because of their higher arches, furnaces heat more rapidly and uniformly, and higher pressure is built up in the larger space. Two companion furnaces each are 36 x 72 inches and 40 x 48 inches inside with 20-inch arches. All units are single-door, built especially for annealing castings and carburizing or bright annealing items in larger production. Four smaller furnaces, each 24 x 38 inches inside with 20-inch arches, are used principally for carburizing or bright annealing items produced in small quantities or for handling special work. An instrument board at the foreman's desk permits frequent checks on temperature and pressure.

Cyanide pots are used for case hardening a few parts which require only a skin or surface hardness. Some items, such as the SAE 1335 steel fan spindle, are tempered. This is done in a gas-fired furnace with automatic temperature control and blower attached, which forces hot gases through work being treated. More direct heat thus is provided, securing uniform temperature.

Combination Quenching

Practically all work is oil quenched in a pit tank at center of the room. This tank is served by overhead cranes, and work may be transferred from the crane in one bay to the other. Main oil-quenching tank is 4 feet wide, 5 feet deep and 20 feet long. This tank is set in a larger 30-foot tank and is surrounded on sides and bottom by 1 foot of circulating water to keep oil cool. The 5-foot water spaces at ends are used for water quenching. All quenching requirements thus are easily accessible in this combination unit.

Oil is pumped into bottom of quenching tank from a 3000-gallon underground storage tank. Warm overflow oil flows back into storage tank, which is surrounded by water, and all waste water runs into this water tank. In this setup, temperature of oil is kept between 150 and 175 degrees Fahr. and never gets hot enough to cause trouble.

Pickling and cleaning equipment for removing scale and the Parkerizing rustproofing unit for pump parts are located also in this center bay. Carburizing boxes are filled at end of room.

Smoke, fumes and hot air are removed by 30-inch fans in the top of each 24-foot bay. Fans discharge through roof stacks. Room is kept

(*Please turn to Page* 59)

Left side of room, showing electric hoist on traveling tramrail. Quenching tank and instrument board are seen at right

Welded Bus Bodies

Simple all-welded steel body reduces production costs 50 per cent. All parts are fabricated in builder's plant with little expense for necessary tools and equipment

By H. C. WENDT
Chief Engineer
Hackney Bros. Body Co.
Wilson, N. C.

■ WHEN Hackney Brothers Body Co., Wilson, N. C., first designed an all-steel school bus body, it was estimated that tools, dies, fixtures and new equipment required would amount to $60,000, a prohibitive cost for a small organization.

About this time a large manufacturer of sheet metal stampings began building parts for an all-steel school bus body for various builders to assemble. As this company had a large assortment of dies available for doors, window openings and other difficult parts, purchasing such items appeared a desirable arrangement. However, actual assembly operations soon revealed an excessively high assembly cost that wiped out the margin of profit. In seeking a way around this, another body was designed for assembly entirely by arc welding with parts to be fabricated in the builder's plant. With it the selling price was brought in the desired range, manufacturing operations became possible at unbelievably low tool, die and equipment costs and profits were immediately evident.

This welded body starts with cowl bar (51) and reinforcement (55) which are spot welded in a jig. The two assemblies (50 and 53) are then positioned in the windshield jig and windshield posts (57, already assembled by spot and arc welding) are inserted and the four tabs of the cowl bar and header reinforcements fastened to the posts with self-tapping screws.

Then working from front of the body, ends of flanges and web of modified channel forming the cowl bar are arc welded to windshield post. Same procedure is followed in arc welding windshield header to windshield post.

Upper dash panel (58) is then inserted and spot welded to cowl bar at its lower edge and arc welded to windshield posts at front. The forehead (59) next is placed in position, upper edge of windshield header spot welded to it and ends of forehead welded to outside corners of windshield posts. Installation of forehead and upper dash panel conceals all previous arc welds as the structure was designed to conceal every weld possible.

All edges of flanges in the windshield opening are arc welded at about 6-inch intervals (60), thus com-

Author of this paper received $3,764.94 award in automotive body classification of the $200,000 program sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland.

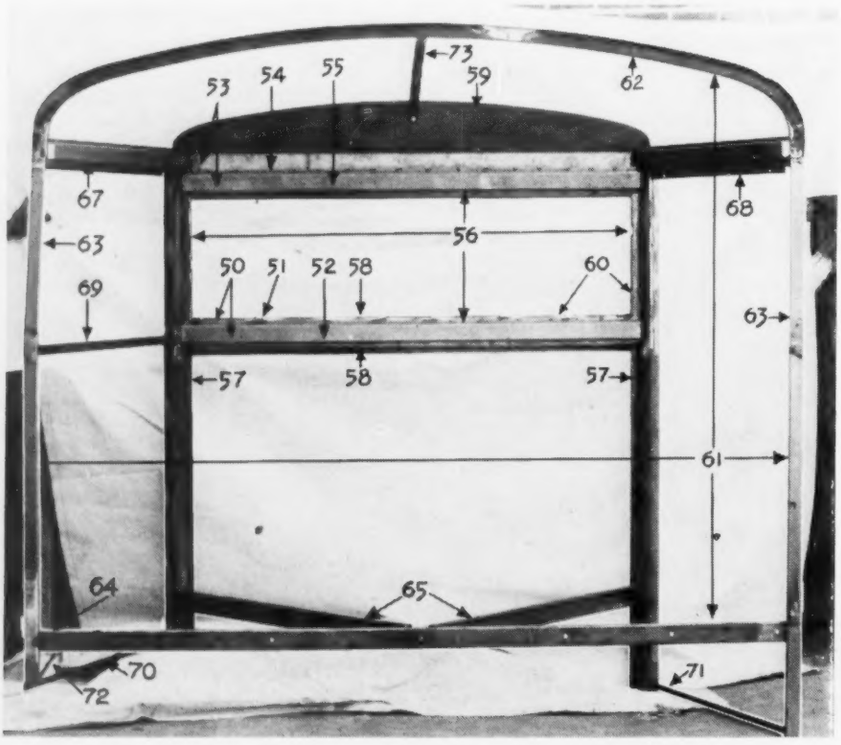


Fig. 1—Rear view of front-end assembly. Its construction is detailed in the text

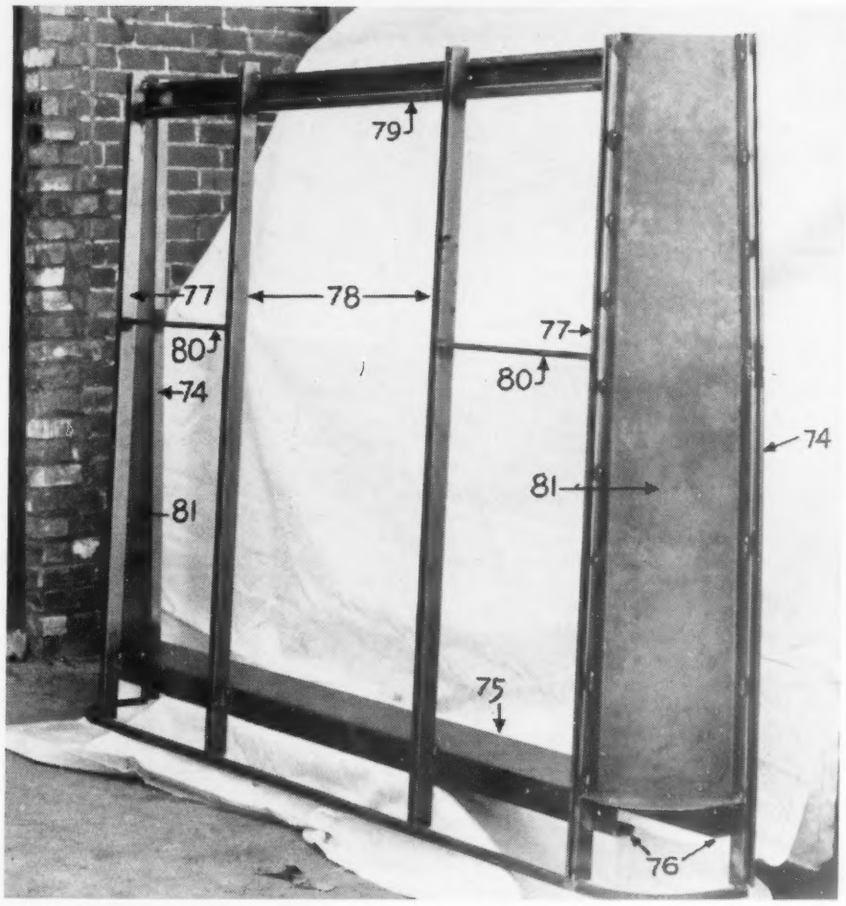


Fig. 2—View of rear assembly as seen from outside bus body

pleting a windshield assembly which inherently has greater strength and rigidity due to tubular windshield posts and double tube construction of cowl and header members. Now post rib and floor bearer assembly (61) is welded. This consists of arc welding the rib (62) to the posts (63). Floor channels (64) are welded to the posts. Front floor diagonal assembly (65) is arc welded over the diagonal channels.

Next step is to weld the driver's window header (67) and front door header (68) to the vertical posts in a jig, all welds being concealed from the inside and later from the outside by application of the front roof panel. Driver's window belt rail (69) is inserted and welded to vertical posts. Next the left-hand front skirt rail (70) and stepwell angle (71) are locked in position and arc welded to the posts.

The front floor, to which the stepwell has been spot welded, is dropped in place and vertical flanges of stepwell arc welded on 4-inch centers to posts and floor channel.

Application of spine rail (73), windshield visor and front roof panel completes front assembly.

Rear assembly, Fig. 2, is made by first welding together post (74); floor (75), already spot welded to floor channel (76); rear window posts (77); and door posts (78). This also is a jig assembly. Diagonal gussets (81) next are welded at 6-inch intervals to adjoining posts. Skirt rail angles (82) are clamped in position and arc welded to the six vertical posts, completing rear assembly.

Referring to Fig. 3, floor angle (82) and rub rear angle (83) are given considerable mass for safety. Experience of the state of North Carolina with crash accidents over a period of years reveals that with every change toward greater mass at these points the record of serious accidents to passengers due to side crashes has decreased. The present structure has a 100 per cent record of no penetration into the interior of the body regardless of character of accident. Although a lightweight structure might be designed to have better deflection characteristics than the one adopted, it is doubtful that it would have the energy absorption and distribution characteristics under impact that the present structure possesses.

Welded in Jig

The side frame of which these angles are a part is assembled in a jig with side roof rails (84), belt rails (85), skirt rear angle (86) and side posts (87). These are positioned against retaining stops, clamped and arc welded on both sides the full length of the vertical intersections. The belt rails and roof rails are now welded. Although this description is brief the arc welding in these assemblies amounts to 179 inches with 156 arc interruptions under the best conditions.

Floor assemblies include standard floor (88) and wheel house assembly (89). Elements in these assemblies are bolted together with seven bolts per section prior to final assembly.

Final assembly, as shown in Fig. 3, is made by positioning the side frames on the floor assembly with the side posts nesting in notches formed at intersections of floor sheets. Side assemblies are squared to floor line, clamped in position and bolted through floor and floor chan-

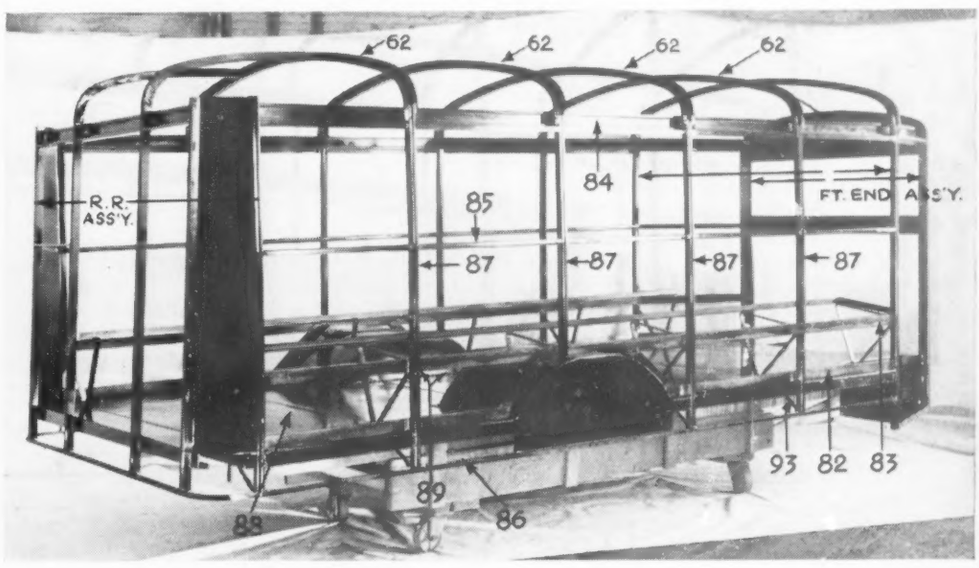


Fig. 3—Final assembly of floor sections, ends, side assemblies and roof trusses

nels by first drilling through the latter two, using pre-punched holes in horizontal leg of floor angle as a guide.

Now roof ribs (62) are slipped over stub ends of posts and properly distanced from floor line by a movable jig which accurately locates all the ribs in the same curved plane. Upper and lower intersections of posts and ribs are arc welded in the next step, diagonal gussets (93) joined to each post and floor channel by arc welds and triangle of floor channel gusset and post completed by welding ends of floor bearers to adjoining posts. This prevents lateral distortion at this point.

Next, front and rear assemblies are slipped into position, contacting floor members bolted together and free ends of skirt rails, floor angles, rub rail angles, belt rails and roof rails welded to the posts (63) and (74). This completes the entire frame assembly.

Outside sheet metal side panels are equipped with bottom flanges bent through approximately 150 degrees to hook over vertical legs of skirt rail angles. Panels then are spot welded to belt rails and to the post where sheets are joined. Rear sheets are applied in a similar manner. All side and rear joints are covered with bolted-on moldings.

Post cover panels equipped with flanges against which the window sash panels register are spot welded to the vertical posts. Side window visors are applied by spot welding through the roof rail flange.

To eliminate roof joints at each rib, the center section is made of three panels running lengthwise the body. The vertical flanges formed by the three thicknesses of 20-gage metal stiffen the roof and eliminate drumming sometimes encountered in steel roofs. Roof sheets are arc welded to ribs on 8-inch centers and lower edges arc welded to roof rails.

Horizontal roof molding is applied by self tapping sheet metal screws. Doors with hinges applied are now hung in the door openings and secured by spot welding the hinges to the posts and also by self-tapping sheet metal screws. This brings the body up to the point where it is complete without glass and ready for paint.

Costs Decreased

Production costs on this body have decreased remarkably with each production order, the last run of 25 being surprisingly low. An impressively small amount of equipment is employed in its manufacture. This includes only a 10 foot, 10 gage power shear; a 10 foot, 10 gage press brake; two small foot operated shears; two hand brakes; a Magee machine; a set of 60-inch hand operated rolls; hand operated rotary shear; a 2-ton Bliss press; a stationary spot welder; and two A.C.B. Flexi-welders.

One of the outstanding factors which produces lower costs is the small amount of assembly time required for the operations described above. Details of actual man hours required, revealed an exceedingly low figure.

The trend toward all-steel school bus bodies appears so strong that it is almost certain other types of construction will be legislated out of existence within a few years. In addition, experience of the state of North Carolina shows that upkeep on welded constructions is negligible. Also, longer service life can be expected when welded construction is employed.

Three-Dimensional Photoelasticity Used To Study Stress and Strain

■ DEVELOPMENT of three-dimensional photoelasticity, a new process which predetermines the effect of stress and strain on complex structures, was announced at the recent eighth semiannual meeting of the Eastern Photoelastic conference at Columbia university, New York. This disclosure was made in reports presented by Dr. Raymond D. Mindlin, department of civil engineering, Columbia university, and Dr. M. Hetenyi, research laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

One hundred scientists studying photoelasticity, use of which enables engineers to calculate the effect of forces on mechanisms by constructing transparent models of resin, passing light through them under various conditions and recording the changes in the light, participated in the conference. The association meets twice a year to acquaint photoelasticians with the latest developments in the field. Originally known as the Cambridge Photoelasticity conference, it gradually expanded to include the New England states and at present includes all the states on the eastern seaboard.

In the past, photoelasticity has been limited to two-dimensional work on comparatively simple objects such as gears, bridge trusses and girders that bear force in straight lines. With use of the new process, structures can be tested upon which force is exerted in more than two ways, Dr. Mindlin said.

In the procedure, a model of a metal part or structure is made of transparent resin and heated to a certain critical temperature. Loads then are applied which are proportionately equal to those that the actual part would bear when in use. With the loads applied, the model is allowed to cool.

Stresses produced in the model change its optical properties, or the manner in which the model transmits light. This is revealed by passing polarized light, which differs from ordinary light insofar as its vibrations follow a definite law, through the model. The new properties are present in the cooled model and the stresses brought on by the loads may be analyzed by optical examination. The stresses in the model are complicated and are therefore extremely difficult to analze.

The striking feature of the new three-dimensional photoelasticity technique is that the model may be cut into slices with no resulting changes in the optical properties. By examining these slices, a more thorough knowledge of the correct procedure in construction can be obtained. The peculiar properties of certain synthetic resins which permit the slicing technique have been understood well only as a result of recent experiments conducted by Dr. Hetenyi, Dr. Mindlin declared.

Asphyxia from Carbon Monoxide in Industry

■ *Carbon Monoxide Asphyxia*, by Cecil K. Drinker; cloth, 276 pages, 6 x 9½ inches; published by Oxford University Press, New York; supplied by STEEL, Cleveland, for $4.50; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S. W. 1.

The author of this volume is professor of physiology and dean of the school of public health, Harvard university. The work is intended primarily for those who have practical concern with the problems of carbon monoxide asphyxia. It is a new presentation, combining the detached point of view of the medical investigator with the more utilitarian outlook of the man who has a carbon monoxide hazard to face in his industry.

The use of gas, gasoline, oil and coal is part of the daily life of nearly the whole world and carbon monoxide is the companion of the use of all these, but not of the proper use. The author seeks to answer the problems arising from these uses.

A bibliography contains reference to sources selected from a large number, principally those leading to other literature of significance. An author index and a subject index make available quick reference.

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Here are the latest industrial publications reviewed for your benefit. They are yours for the asking. There is no charge or obligation. Simply fill in the convenient coupon and return.

(1)—Pyrometers

Leeds & Northrup Co.—12-page, illustrated bulletin N-33B-600B. Describes newly developed temperature-limit control for furnace roofs with Micromax Rayotube pyrometers. Advantages and methods of operation are covered. Various types of equipment are described.

(2)—Chrome Alloy

The Babcock & Wilcox Tube Co.—Technical bulletin No. 9. Methods of working seamless tubes and pipes of intermediate grades of B & W Croloys containing chromium, molybdenum and other alloying elements are described. Proper procedure for fabricating, hot and cold bending, upsetting, forging and welding are covered.

(3)—Nails & Wire

Wickwire Brothers—48-page, illustrated, pocket-size stock list. All types of nails, staples, annealed or galvanized wire, barbed wire, stone wire, cut wire, etc. are described and accompanied with price lists. Engineering tables are included and the booklet is completely indexed.

(4)—Patching Cement

Midland Paint & Varnish Co.—6-page folder, "Cleve-O-Cement," a special patching composition for chipped and rutted cement floors is fully described. A list of users is given. Advantages and methods of applying are discussed.

(5)—Bronze

Bridgeport Brass Co.—11-page, illustrated technical booklet on "Duronze III." A patented high strength, silicon aluminum bronze, "Duronze III" is fully described. Forms available, physical characteristics and properties and full information on machining, forging and heat treating are given. Numerous examples of its application are shown.

(6)—Alloys

Electro Metallurgical Co.—20-page booklet "Electromet Products and Service." Describes numerous alloys and the complete services available from this company. Provides full information on properties and use of various alloys under different conditions. Briquetted ferro-alloys for cupola use are also covered.

(7)—Precision Casting

Birdsboro Steel Foundry & Machine Co.—8-page, illustrated folder on the "Randupson Process." Information on the history, development and advantages of this process of precision casting are given in detail. 12 points of superiority are listed and examples of the Randupson Process are shown.

(8)—Toggle Clamps

Knu-Vise Products Co.—4-page, illustrated bulletin. Illustrates and describes toggle clamps, toggle pliers, and spring gauges for the rapid handling of productions parts. Full information including prices are given.

(9)—Springs

Lee Spring Co., Inc.—4-page spring specification form. Convenient for specifying types of springs and materials required in all types of carbon steel wire, alloy steel and nonferrous metal springs. Numerous types of Helical springs are shown.

(10)—Material Handling

American Hoist & Derrick Co.—8-page, illustrated bulletin 700-G-11. American Gopher shovels, draglines, and clamshell cranes in capacities of 1½, 1¾ and 2 yards are described. Information on design, construction and operation are given. A high speed boom hoist for steel erection and the American improved compressed air control are particular features.

(11)—Grease

E. F. Houghton & Co.—4-page, illustrated booklet 2-79. Ball and roller bearing grease made with filtered paraffine-base oil, anti-corrosive and with high melting points, are described and their applications discussed. Lubrication charts for ball and roller bearings are included.

(12)—Electric Hoists

Allis-Chalmers Mfg. Co.—8-page, illustrated bulletin 1829-A. Small standard electric hoists for rope pulls up to 8000 pounds are fully illustrated and described. Features of both single and double drum hoists are given. A list of different divisions and offices of this company are included.

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(13)—Material Handling

American Monorail Co.—48-page, illustrated bulletin No. 11-38. "How Handling Problems Have Been Solved" describes numerous applications of overhead handling equipment in industry. Details of track of various types and the pneumatic tire drive are given.

(14)—Valves and Fittings

Crane Co.—48-page, illustrated booklet on Crane research facilities No. AD1288. Gives the full story of this company's laboratory and research facilities and describes methods of development of valves, fittings, plumbing and heating equipment.

(15)—Material Handling

The Atlas Car & Mfg. Co.—4-page, illustrated bulletin 1253. Cupola charging scales and bucket handling systems featuring magnet loading of buckets by yard cranes are described. Actual installation views are shown and a discussion on operation is given.

(16)—Instruments

C. J. Tagliabue Mfg. Co.—12-page, illustrated bulletin No. 1178. Announces a new line of 9-inch recorders and recorder controllers for recording and controlling temperature and pressure. Advantages are given and applications are described.

(17)—Band Filer

Continental Machines, Inc. —4-page, illustrated bulletin. A new band filer which does interior and exterior filing is described. File bands ¼ and ⅜-inch wide can be used on materials ranging from high carbon steel to soft brass, wood, etc.

(18)—Drill—Reamer Chart

Danly Machine Specialties, Inc.—Engineering data card. Drill and reamer sizes for dowel pins together with size selection data and working information are given in convenient reference form.

(19)—Oil Burner

Thermal Processes, Inc. — 4-page, bulletin on B-300 short flame and B-400 long flame mechanical, atomizing, automatic, air-adjusting oil burner. Applications and method of operation of this oil burner, recommended for indirect firing in such places as galvanizing pots, drying ovens, pot annealing, etc. are fully covered. Blue print type sectional view of structural details is included.

(20)—Gas Carburizer

Continental Industrial Engineers, Inc. — Technical bulletin No. 115. This bulletin explains the new Hypercarb Process for gas carburizing and describes the Muffleless furnace equipment for this operation. Technical information and photographs of the equipment and micro-photographs of the resultant product are included.

(21)—Temperature Gauges

Weston Electrical Instrument Corp. —12-page, illustrated bulletin No. T11A. General purpose and heavy duty types of industrial temperature gauges for low, medium and high temperatures are fully described and a price list is included. Typical scales are illustrated and accessories are covered.

(22)—Belting

The Buckeye Belting & Supply Co. —Illustrated folder. Buckeye vacuum cup bulldog grip belting for power transmission is fully described. Available in oak tan, chrome or combination tanned leather. Claimed to be particularly valuable in short-center and pulley ratio drives.

(23)—Radiation Pyrometers

Thwing-Albert Instrument Co.—2-page, loose-leaf leaflet B-1138. Indicating radiation pyrometers both portable and wall types are described. A cross-sectional photograph shows method of operation.

(24)—Power Transmission

Ramsey Chain Co., Inc. — 40-page, illustrated catalog 638. Silent chain drives for high speed power transmission are thoroughly described and full specifications are given. Typical installations are shown in detail. Engineering tables for determining proper chain specifications are included.

(25)—Refractory Cement

Quigley Co., Inc. — 20-page, illustrated catalog H. G. 501. "Hytempite" plastic air-setting, high temperature cement for bonding refractory brick and shapes is described. Particularly suitable for monolithic "Gas-Tite" baffles and for quick hot or cold furnace repairs.

(26)—Electric Heaters

American Car & Foundry Co.—4-page, illustrated bulletin No. 7964. Berwick electric type "L" and "LA" metal heaters equipped with electric eyes for temperature control are described and their applications stated. Full specifications and operating information are given.

(27)—Steel

J. M. Tull Metal & Supply Co., Inc. — 36-page, stock list. Full information on seamless steel pipe, round and square steel tubing, stainless steel tubing and welded square and rectangular pipe is given. Standard tolerances are covered in detail.

(28)—Die Steel

Crucible Steel Co. of America—4-page, bulletin No. TS200. Provides full information on machinability, toughness, size change, analysis, annealing and hardening of a new die steel known as "Airkool." Advantages are outlined.

(29)—Clutch

Overload Release Clutch Co., Inc.—4-page, illustrated folder. Describes application and advantages of the overload release clutch as applied to stokers, gear boxes, conveyors, etc. Full specifications and information on design are given.

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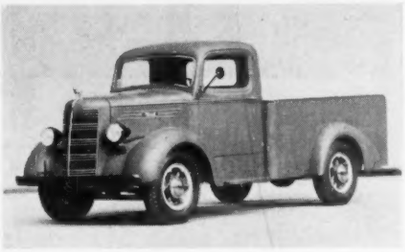
NEW METAL PRODUCTS

■ Rounding out its light-capacity line, Mack Trucks Inc., Long Island City, N. Y., has announced the lightest and lowest-priced truck it has ever produced, the Model ED, which has a chassis weight of 3100



pounds, leaving 5400 pounds for body and load.

Standard wheelbase length is 120½ inches, and a special wheelbase length of 136½ inches is obtainable. Streamlined cab has an all-metal roof and is equipped with many refinements, such as the chromium windshield frame, safety glass and clocktype instruments. Chassis frame is pressed carbon steel and has five cross members. Truck is powered by a 67-horsepower, 6-cylinder engine. Three-speed transmission is standard, and a four-speed transmission is available as an extra.

The new model is priced at $675, f.o.b. Allentown, Pa.

■ Traditional concepts have been discarded in the design of an ultra-modern grouping of Steel Age desks and files, just introduced by Corry-Jamestown Mfg. Corp., Corry, Pa.

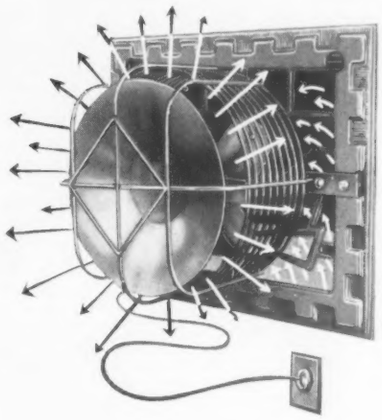
This steel office furniture is finished in a warm gray metallic tone, said to harmonize with any decorative motif. Functional design leaves no sharp corners to catch clothing. Island type pontoon bases give ample foot room and facilitate cleaning. Smooth black linoleum tops and attractive chromium hardware with black enamel inlays complete the color treatment of these desks.

Abundant storage space is provided, and crosswise filing can be

arranged in box drawers. Provision is made for electrical connections.

■ An interesting method of drawing hot air from a furnace and recirculating it in hard-to-heat rooms is found in the Deflecto Registair, a circulator just introduced by Kisco Co., St. Louis.

Unit draws heated air through furnace pipe by powerful suction and circulates it throughout the room. It can be attached to any register, floor or wall type, with only a screwdriver. No drilling or cut-



ting is necessary. It is necessary only to plug into the nearest socket.

Circulator is simple in construction, consisting principally of a fan, induction motor, deflection plate and safety guard.

■ Designed to simplify and accelerate the movement of merchandise, machine parts and supplies, a light-

weight shelf truck has been placed on the market by Morse Mfg. Co., Syracuse, N. Y.

End frames and shelf crossbars of truck are angle steel. Malleable iron casters, mounted in the end frames, have either metal or rubber tires. Frames are punched with a series of holes, permitting any number of shelves, any length, spaced as required. Two sizes of end frames are furnished—15 inches wide by 48 inches high, and 18 inches wide by 58 inches high.

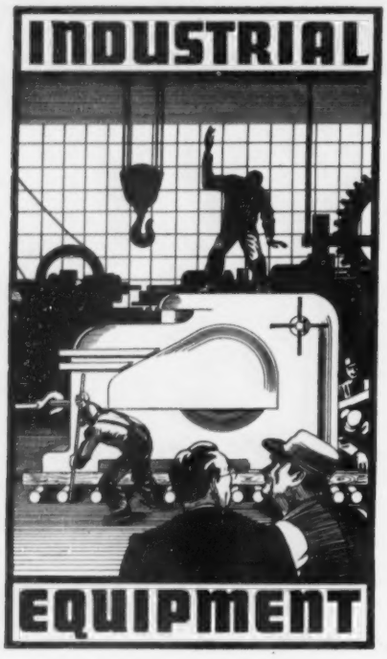
■ A radical departure from conventional design has been made by Friden Calculating Machine Co., San Leandro, Calif., in the stream-

lining of its line of Super-Matic calculators. Appearance of the new model is improved by chromium nickel ornaments of modern design on the corners and back of the machine. The tradename has been streamlined and now appears on the sides and back in raised chromium nickel letters. Careful attention has been given to the color scheme, which is special gunmetal gray with control keys and keyboard in tones of green which eliminate eyestrain and blend with the gray.

■ A vacuum curved plate casting box, designed especially for producing and maintaining ideal casting temperatures, has been introduced by Goss Printing Press Co., Chicago.

Box has an insulated back, promoting greater uniformity of temperature. Two large panels completely enclose vacuum chambers for cleaning purposes. Box is electrically heated, unit being automatically cut out by an adjustable thermostatic control.

Core is equipped with automatically controlled water circulating system, which pre-heats cooling water and eliminates any tendency to chill. Special centering devices are built into casting box, and thermometers are provided on both members to give greater control.



Furnace Treats Steel Without Decarburization

■ Surface Combustion Corp., Toledo, O., has introduced a new type of controlled atmosphere furnace, known as Char-Mo, for treating molybdenum alloy and other steels, both highspeed and carbon, without decarburization.

Controlled atmosphere used was developed especially for treating molybdenum highspeed steel without a protective coating such as borax. This atmosphere is said to be ideal also for treating all types of steel used in the manufacture of tools, dies and wear parts which require a non-oxidizing, non-decarburizing atmosphere for heat treating.

In production of this atmosphere, a carbonaceous material, such as charcoal, and an oxidizing base gas, such as air, are used in a self-contained generator integral with the furnace. Essentially it is a mixture of balanced carbon oxides, largely diluted with inert nitrogen.

Furnace is offered in two types, a horizontal muffle type and a vertical muffle type, and in temperature ranges of 1400 to 1850 degrees Fahr. and 2000 to 2400 degrees Fahr. A variety of muffle sizes are available in both types.

Portable Hoist Operates From Ordinary Circuit

■ Chisholm-Moore Hoist Corp., Tonawanda, N. Y., has added to its line a portable Comet hoist, easily carried and installed by one man and powered by a heavy duty, high torque motor that operates on current from an ordinary light circuit. It is recommended as a materials handling unit where use of heavy equipment is too costly. Hoist is readily adaptable to production lines in large plants.

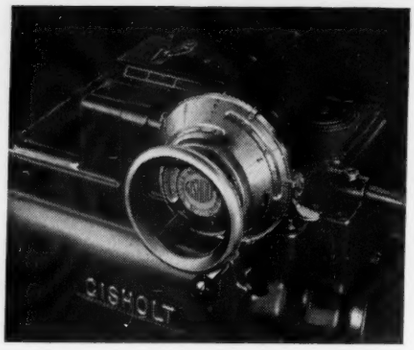
In the construction of this hoist

ball bearings are provided at all rotating points. Gears are precision machined of heat-treated alloy steel. Controller, with delayed reversing feature, operates easily with one hand and affords sensitive control for lifting load distances of a fraction of an inch. Brake prevents drifting of load.

Hoist is offered in four capacities: 250, 500, 750 and 1000 pounds; and several speeds are available. The 500-pound size weighs only 85 pounds.

Speed Selector Insures High Lathe Efficiency

■ Gisholt Machine Co., Madison, Wis., has developed a speed selecting device for obtaining any one of twelve spindle speeds available on its Nos. 3, 4 and 5 ram type universal turret lathes. Device is power operated; operator simply sets dial and machine automatically makes shift to give correct spindle speed.



Speed selector provides three types or methods of operation. First is the direct method, where spindle speeds are changed simply by turning dial to desired speed or to diameter of particular cut being taken. Second is the preset method, where desired spindle speed for next cut may be selected and preset in advance of actual speed change and while one cut is in progress. Third is the high-low method, which may be used at any time in conjunction with either direct or preset operation. This provides a quick change between high and low speeds.

Handwheel, as seen in illustration, controls both inner and outer dials. Spindle speeds, ranging from 28 to 730 revolutions per minute, are marked on the outer dial, and work diameters from ¼-inch to 12 inches are marked on the inner dial. Cutting speeds range from 40 to 600 feet per minute. In operation the proper feet per minute cutting speed for particular metal being turned and tools used is set on a dial by means of knurled wheel. Any adjustment of cutting speed produces a corresponding change in relative position of diameters.

Lamp and Projector Are Combined in Single Unit

■ Westinghouse Electric & Mfg. Co., Pittsburgh, has introduced a type of Mazda lamp, known as the

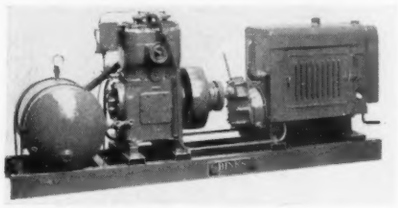
Projector Lamp, which combines bulb and projector in one unit.

Inside the flared bulb is an accurate parabolic metal reflector, precisely positioned in relation to the filament. Light of the filament is thus directed in a powerful beam.

Lamp is equipped with a medium screw base fitting an ordinary socket. It is rated at 150 watts and is available for 110, 115 and 120-volt circuits. Two types are offered, one giving a narrow beam and the other a wide beam. This self-contained unit may be used in a wide variety of commercial installations, as well as for local lighting in industrial plants. It lists at $1.70.

Water-Cooled Compressor Mounted on Flat Truck

■ Binks Mfg. Co., 3114-40 Carroll avenue, Chicago, recently has placed on the market a large water-cooled compressor. Water which cools the



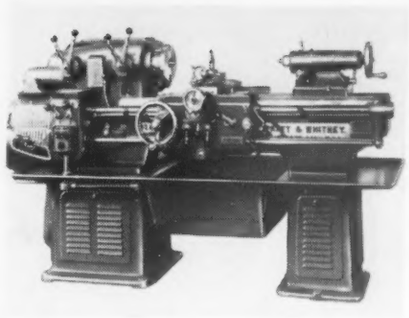
gasolne engine also cools the compressor.

Unit is twin-cylinder type having a displacement of 55 cubic feet per minute. Gas engine develops 6 horsepower. Engine, compressor and air tank are mounted on skids. The whole unit is mounted on a flat truck for carrying from job to job. Compressor will handle from three to four heavy-duty spray guns for cut back asphalt, sound deadner and other heavy material.

Lathe Gearbox Provides Many Quick Feed Changes

■ Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn., has announced a 12-inch Model C lathe, available in center-to-center capacities of 30 and 54 inches, with 18 spindle speeds in geometric progression up to 1500 revolutions per minute.

Constant speed 3-horsepower driving motor is mounted in cabinet leg under headstock and has a hinged platform with screw adjustment for belt tightening. V-belt drive carries power to main driving pulley. Power comes into machine through a multiple disk clutch, controlled by either of two levers, one at front of headstock and other at right side of apron. Power is taken from headstock through a set of ratio



gears to the quick-change gearbox, which provides for 60 quick changes of feed ranging from 0.0025 to 0.152-inch.

Spindle nose is flanged type. A camlock device permits spindle chucks to be mounted rigidly and accurately. A synchronized high-speed clutch mechanism has been incorporated into headstock for reversing lead screw and feed rod drive, making possible reversing carriage at higher speeds without stopping.

Carriage is mounted on one V and one flat way on the bed and is unusually deep and wide. It is gibbed front and back. Large micrometer dials are graduated to give work diameter reductions in thousandths of an inch. Tool post capacity is ½ to 1-inch. The 30-inch lathe weighs 2700 pounds net without motor and starter and the 54-inch model weighs 3075 pounds. Both are 31¾ inches wide, and are 88 and 112 inches long respectively.

Big Cylindrical Grinder Has Traveling Wheelhead

■ Norton Co., Worcester, Mass., recently completed a huge cylindrical grinder, said to be the longest of its type. Straight rolls and long, solid or hollow shafts up to 36 inches in diameter and 40 feet long can be ground to within extremely close limits, and taper work up to 5 degrees included angle can be handled by swiveling work table.

Total overall length of machine is 80 feet, base and work table each being made in two sections, butted end to end. Total net weight of grinder, including its eight motors, steadyrests, etc., is about 185,000 pounds.

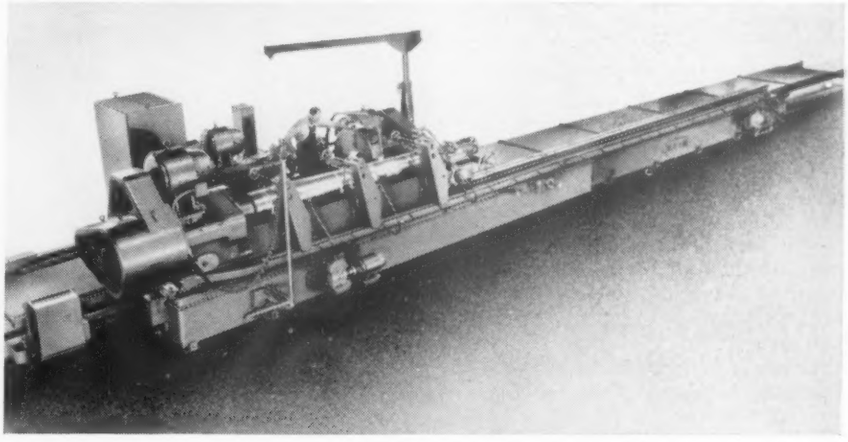
An immense headstock, mounted on left end of work table but movable along the table, is driven by a 15-horsepower motor through multiple V-belts and a silent chain drive. Footstock, of the sliding spindle type, has worm and gear reduction for easy movement of the spindle by handwheel. Swivel table is pivoted on the base near right end. About 20 inches movement of the end of the table is required to obtain maximum taper. Traveling table has a flap top 18½ feet long and 4½ feet wide on which is mounted the grinding wheel head, table traverse mechanism, lubricating and coolant pumps and electrical control apparatus for entire machine. This table is traversed at speeds varying from 3 to 105 inches per minute.

Grinding wheel, 42 inches in diameter with 3-inch face, is driven by a 25-horsepower motor. Wheelhead is provided with a micrometric hand feed and a motor driven cross traverse. Ten steadyrests are provided with capacity up to 24-inch work diameter. These are clamped to the work table and are adjustable from the operator's normal position.

Cycle of Race Grinder Is Completely Automatic

■ Landis Tool Co., Waynesboro, Pa., recently introduced its No. 2 Race-A-Way grinder, which may be had either tooled to internally grind raceways of outer races or to externally grind raceways of inner races. Internal machine has capacity to handle smaller sizes up to and including the 212, 311 and 409 groups; sizes including the 218, 316

Unusual accuracy for so large a machine is claimed for this 80-foot-long grinder. Straightness within 0.0008-inch is maintained on a 33-foot shaft



and 414 groups may be handled by the external machine. They may be utilized for both single and double row races.

To insure rapid production entire grinding cycle is automatic, once it has been set in motion. One man can operate two machines. Provision is made to form grind each raceway just at the end of the cut. Movements of the machine are controlled by electric pushbuttons and selector switches, although certain movements are hydraulic. A large master safety button will stop every machine movement instantly.

Automatic sizing is accomplished by a Landis-Solex sizing device in combination with an electric timing device. Oscillating movement of the workhead is actuated mechanically through the medium of an ad-

justable crank arrangement. Wheelbase is moved into and out of grinding position by means of a crank motion. On the internal machine cam motion is combined with crank motion for cross movement of the wheel into and out of the race. A hydraulic motor actuates these motions.

Grinder is very modern in design. Outside of bed is complete free of attachments, appendages and control boxes. Everything is covered and yet accessible.

Socket Wrenches Are Chromium Alloy Steel

■ J. H. Williams & Co., 75 Spring street, New York, have announced addition of three Bantam sockets to their Supersocket wrench line.

These new lines include extra deep 12-point sockets 2 to 2½ inches long, in six sizes with openings from 7/16 to ¾-inch; extra deep 8-point sockets 1½ inches long, in four sizes with openings from 7/16 to ⅝-inch. All these sockets are designed for use with ratchets and other handles fitted with ⅜-inch square drive, and have thin walls for operation in close and awkward places.

Sockets are very short and compact in design. They operate through a range of 180 degrees and are fitted with spring tension to maintain desired angle when being applied to

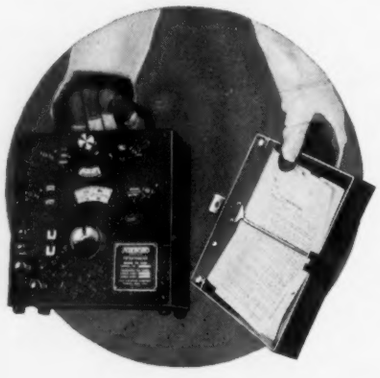
the job. High tensile chromium alloy heat-treated steel is used in making these sockets, giving them maximum toughness and strength.

Pyrometer Protected by Welded Aluminum Case

■ Foxboro Co., Foxboro, Mass., has devised a portable indicating potentiometer pyrometer for temperature measurements where a permanent installation is not required. It is useful also for testing and standardizing service instruments and thermocouples, for exploratory work and as a spare instrument.

Finished in crystalline enamel, the all-welded aluminum case protects instrument against dirt, acids, high temperatures and abrasion. An open, legible temperature scale, 17 inches long, makes it possible to read to close limits. Double range instruments have two scales, both of which may be for temperature and for the same or different thermocouples. Each scale may be calibrated for millivoltage, or one for millivoltage and one for temperature. Single range instruments have one scale, either for temperature or millivoltage.

Increased mechanical sensitivity is inherent in the vernier, assuring precise balancing by the vernier

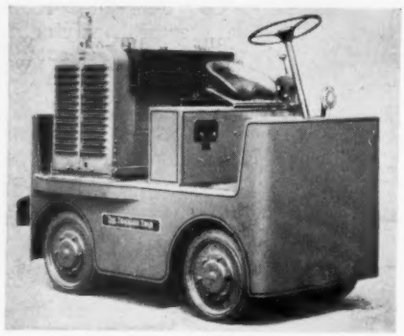


type dial. Pyrometer operates either horizontally or vertically with equal accuracy. Automatic compensation for cold-junction errors is provided by use of a cold-junction compensator coil. By reversing coil, meter can be used as a source of electromotive force, or for checking calibration of other instruments.

Vernier type rheostat enables operator to standardize circuit quickly and accurately. Made with platinum iridium contact points, standardizing rheostat and slide wire contact offer considerable resistance to corrosion and wear.

New Electric Tractor Has Four-Wheel Drive

■ Mercury Mfg. Co., 4044 South Halsted street, Chicago, has announced a heavy duty electric tractor of the four-wheel drive, four-wheel steer type, developing 3500 pounds drawbar pull. Having a light running speed of 7 miles per hour, this tractor has two double re-



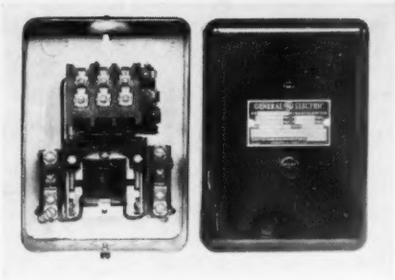
duction, spiral bevel and spur geared drive axle assemblies with full floating axle shafts and tapered roller bearing mounted wheels. Each drive is powered by a heavy duty, series wound motor.

Tractor brake system is of the four-wheel equalized type. External contacting shoes operate on drums mounted on intermediate gear shaft extensions on each drive axle. Travel controller governing both motors provides three speeds forward and reverse. As illustrated, tractor is equipped with a heavy duty gas-electric unit, but battery compartment to accommodate required cells can be furnished.

Small Magnetic Switch Said to Be Tamperproof

■ General Electric Co., Schenectady, N. Y., has developed an alternating current magnetic switch for full-voltage starting of single, two and three-phase motors. Although small and compact, switch is designed in accordance with standards of electrical clearances, mechanical strength and ratings.

Basically, it consists of a line contactor, with interlock to provide under-voltage protection, and two isothermic temperature overload relays to protect motor against over-



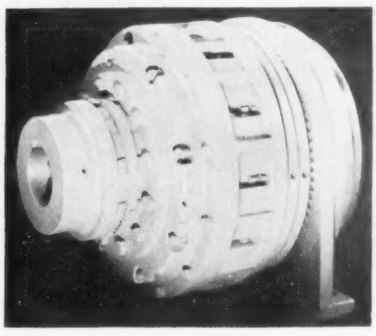
heating. These elements are mounted in a sheet steel case. Open type switch is furnished with a rigid mounting plate to permit easy mounting on either an insulating or a conducting panel.

Contactor is direct-acting, solenoid operated type. Movable magnet frame is connected directly to a hot-molded insulating block, which carries the movable contacts. The E-type magnet employs an improved rivet type pole shader on two legs of the magnet, with the air gap necessary to assure dropout when coil is de-energized. Double-break contacts eliminate troublesome flexible shunts, and both stationary and movable tips are made of fine silver with a thin steel backing for mechanical strength. Relay is permanently adjusted at factory and is tamperproof.

Clutch-Brake Unit Is Useful as Safety Device

■ Stearns Magnetic Mfg. Co., Milwaukee, has added to its line a magnetic clutch - brake combination, which has the unique quality of providing a positive clutch, friction clutch and friction brake.

Combination is styled "FFP" and



is unusual in that it can be engaged at normal motor speed. It is claimed to be the only magnetic friction device which gives smooth acceleration, positive non-creep running and split-second, disk brake stopping.

Device lends itself to simple remote control facilities. One pushbutton for starting and another for running, and any convenient number of pushbuttons for stopping will operate the combination. It is said to be particularly adaptable as a safety device on positive drives.

Variable Transmission Provides Speed Changes

■ Ideal Commutator Dresser Co., Sycamore, Ill., has announced its Select-O-Speed variable speed transmission which may be attached to old or new machinery to give an infinite selection of speeds over a

5-to-1 ratio. This unit is suitable for use with drill presses, rip saws, milling machines stokers, conveyor tables and machine tools.

Transmission is simple in design and is fully enclosed for safety and protection. It uses standard V-belts. Unit comes assembled, ready for use. Housing is bolted down in direct line of the drive. Installation can be made on floor, ceiling, wall or machine—upside down or right side up. Belt tension is maintained automatically.

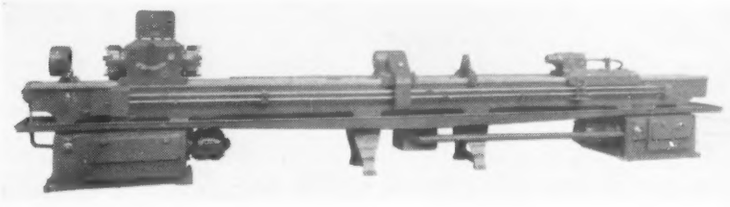
Deep Hole Boring Lathe Employs Hydraulic Feed

■ R. K. LeBlond Machine Tool Co., Cincinnati, has introduced a deep hole drilling, boring and reaming lathe, designed not only to meet the government's gun boring requirements, but also to qualify for boring hydraulic cylinders, oil well casings and similar industrial applications. For general use, machine can be adjusted to take stock any length, 5¼-inch outside diameter, boring a hole of 2½ inches maximum diameter.

Rigid, box constructed bed provides a wear resisting, non-galling surface entire length of the ways. Regardless of resistance variation, hydraulic feed mechanism gives uniform feeds from 0.0006-inch at 500 spindle revolutions per minute to 0.380-inch at 20 revolutions per minute. Stops shut off the feed when carriage reaches required limits, and a safety stop protects machine against overloads.

Headstock mechanism provides three mechanical changes of speed through sliding gears. By means of change gears in headstock and a 20-point field rheostat, spindle has a range of speed from 20 to 515 revolutions per minute.

Used for gun-boring, this lathe will handle stock 96 inches long



Hydraulic Lift Truck Has Variety of Uses

■ Lyon Iron Works, Green, N. Y., has placed on the market a lift truck with hydraulic elevating table which may be modified for many particular uses. It may be used for handling sheet metal and feeding various types of machines, such as shears, presses and punches. Truck carries sheets at a convenient height for feeding.

Other uses are handling heavy rolls in and out of rolling machines and handling dies in and out of

presses. Truck illustrated was designed for these purposes. Winch is mounted on front end of table and elevates with it. This winch is used for pulling rolls and dies on the table.

This truck's table is 24 inches wide and 48 inches long. It has a lowered height of 20 inches and may be ele-

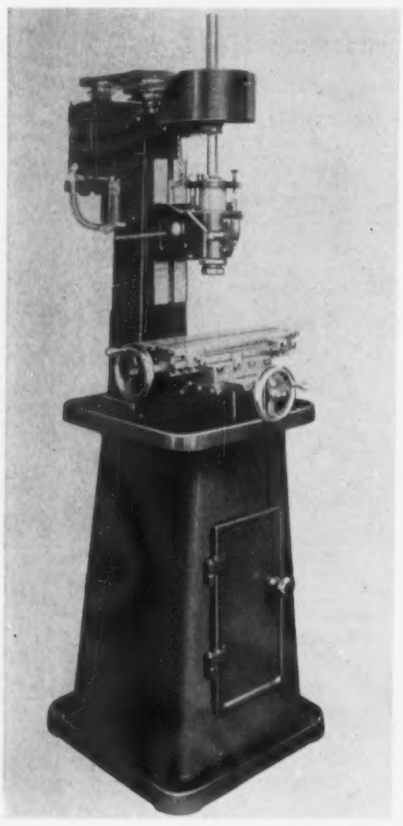
vated hydraulically to a height of 43 inches. Other sizes and heights are available. Elevation of table is through a lever arrangement and hydraulic rams. A two-speed hand operated pump furnishes power to the rams.

Milling Unit and Jig Borer for Small Work

■ Linley Bros. Co., Bridgeport, Conn., has introduced a highspeed vertical bench milling machine and jig borer, with micrometer screw feed quill, for small work such as dies, fixtures, model work, molds for plastics, metal pattern work and similar applications.

All flat surfaces of the compound table assembly are hand scraped for accuracy, and ways are securely gibbed for rigidity. Table is equipped with two adjustable stops, and a lock is provided on the saddle. Spindle is heat-treated chromium nickel steel, ground all over and lapped on bearing surfaces.

Sliding head is counterbalanced by the use of a weight of correct size through a chain running over rollers, and the quill is counterbalanced by the same weight through a compound lever to remove any backlash. A smooth feed is provided through a ten-pitch screw running parallel to and solidly attached to the quill flange at its upper end. Handwheel has a 2½-inch dial with one hundred 1/1000-inch markings for use in connection with a vernier reading in tenths of a thousandth. A depth stop gage in front of the quill is graduated with ten lines to the inch; one turn of the handwheel equals one space, or 1/10-inch on this gage.



V-belts are used on a compound drive which provides eight spindle speeds. Unit is powered by a reversible 1/3-horsepower motor.

Mesh Insert Centers Wheels Automatically

■ Ever-Tru Abrasive Wheels Inc., 145 Hudson street, New York, has placed on the market a line of coping and grinding wheels with a patented metallic center containing an elastic wire mesh insert woven of special alloy spring steel.

This feature is said to maintain constant contact between wheel and object being ground, due to automatic self-balancing attained by centrifugal action of the elastic mesh insert. These grinding wheels provide at high speeds the advantages of a vitrified bond with the elasticity of bakelite and similar resinoid bonds.

It is claimed this type of wheel requires less pressure, thus decreasing normal fatigue of the workman from shaking and vibration. Less heat is generated. Maintained accuracy of outside periphery reduces tendency of wheel to wear out-of-round. Centers may be used over and over again after abrasive has worn down to metallic center. In addition to steel, these centers may be obtained in aluminum, with wire mesh cast into the aluminum flanges and hub. This reduces weight and power requirements. Trial wheels are being distributed.

Anti-Corrosive Finish Protects Steel Conduit

■ Walker Bros., Conshohocken, Pa., have developed a new type of conduit, known as Dualcote, which, as the name implies, derives its stand-up qualities from a combination of two protective zinc coatings, fused into the outside and inside of the steel tube.

This process does more than cover the surface with a deposit of zinc. It actually alloys the zinc with the steel, forming a galvanized coating that will not chip or crack when conduit is bent during installation. Conduit is protected against salt water, acids and caustics by the outer coating, which contains an inert ingredient said to be practically indifferent to chemical reaction. This substance is carried in a vehicle which dries by evaporation rather than by oxidation and consequently relies on no oils that can be broken down by corrosive agents.

Power Feed Drill Has Accessible Controls

■ Buffalo Forge Co., Buffalo, has added to its line the No. 16 power feed drill, intended to meet demand for a substantial positive gear drive, positive clutch type power feed for a No. 2 Morse taper drill.

Feed is engaged by feed motion of the handle and is disengaged by upward motion of the handle. Take-off is fully geared. Both depth and feed dials are read from front of machine, and depth control is set from this position. Feed change may be made during operation.

Worm is hardened gear steel and runs in bronze bushings with thrust taken on a ball thrust bearing. Drive clutch members are chromium nickel steel.

Operation of drill is simple. Feed clutch cam is held out of engagement by spring pressure. When resistance is met, cams are forced apart and toothed clutch members are meshed, engaging power feed with feed pinion. When feed has been advanced to required depth, clutch hub is stopped by a pin on the indicator dial and feed is stopped, spindle returning to original position. A lefthand feed handle enables operator to shift instantly from power to hand feed without disturbing depth stop adjustment. Handle can be replaced with an automatic tapping feature.

Handling Melts

(*Concluded from Page* 44)

trucked through finishing department to delivery.

Now castings are put on skids when taken from the molds and again after being finished. This permits conveying them by the lift truck and eliminates three of the four former handlings, the transfer off the skid platforms onto the delivery truck being the only one remaining.

Pouring is done in the afternoon. Trucking of castings between foundry, finishing department and outgoing truck occurs mainly in the morning while charging the annealing furnace is done at intervals through the day. Under this routine, the low-lift truck battery is charged at night.

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Flexible Treating

(*Concluded from Page* 47)

almost entirely clear of smoke and gases, and a large percentage of hot air is drawn from immediate working floor. During summer openings in wall at floor level permit entrance of outside air which aids in maintaining a more workable temperature.

This assortment of equipment and its arrangement in the heat-treating department of Schwitzer-Cummins plant permit quick and individual handling of a wide variation of work, where differing quantities, sizes and alloys each require specified heat treatment.

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Maintaining Motors

(*Concluded from Page* 38)

jacent to these parts will often run from 5 to 10 degrees Cent. hotter than the other bearing because of the relatively poorer ventilation and proximity of hot member.

Temperatures in foregoing tables are not the lowest attained under ideal conditions nor are they the highest under which successful operation may be achieved. They are rather what may be expected in many cases with allowance for a small amount of rubbing of sealing washers, internal friction of lubricant, a small amount of end thrust and other incidental conditions.

Occasionally the structure on which the motor is mounted becomes distorted due to setting of foundations or other causes. This might interfere with alignment and result is an increase in bearing temperature over that observed during a nearly period of operation. Another symptom of trouble is an increase in vibration and noise which might arise from the same cause or from other sources such as a failed ball bearing, a bent shaft, a worn coupling, worn gearing, bearing loose in housing, unbalance developed in rotating element, loose blower, rotor striking stator because of worn shaft or bearing, or excessive temperature of rotor, etc.

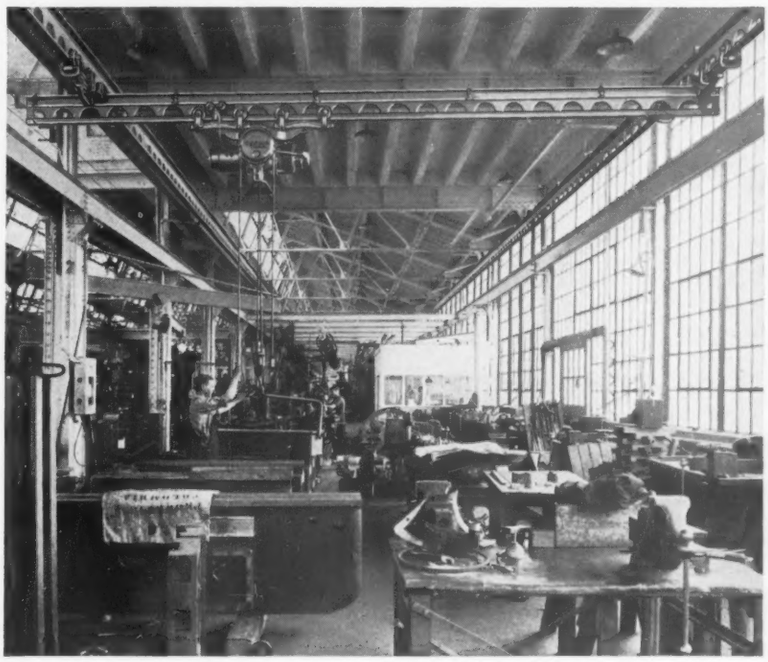
If any of these defects have developed they should be immediately remedied. Rubbing of rotor on stator is especially destructive. In most motors the size of air gap between these parts may be readily checked by means of feeler gages inserted through openings provided. Minimum air gap measured should not be less than 33 per cent of maximum. When symptoms of trouble arise, a check for alignment and for uniform air gap aids in determining the cause prior to correction of the trouble.

Temperature of bearings depends upon a number of factors among which are: Rate of conduction of heat through the walls of the bearing housing, amount of exterior surface available to radiant heat, amount of air circulated over such cooling surfaces, amount of heat carried away by lubricant, etc. All these affect cooling.

CLEVELAND TRAMRAIL

MATERIALS HANDLING EQUIPMENT

In the Metal Working Industry



• In the Machine Shop, Hand operated light weight, fast, easily propelled smooth running cranes and carriers, are effective equipment for service.

• This is a two ton job with motor operated hoist.

ALSO BUILDERS OF

CLEVELAND CRANES

FOR EVERY INDUSTRY

CLEVELAND TRAMRAIL

Division of

THE CLEVELAND CRANE & ENGINEERING CO.

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WICKLIFFE, OHIO

Or consult your phone directory under Cleveland Tramrail.

Monorail Hoist Design Is Boon to Operator

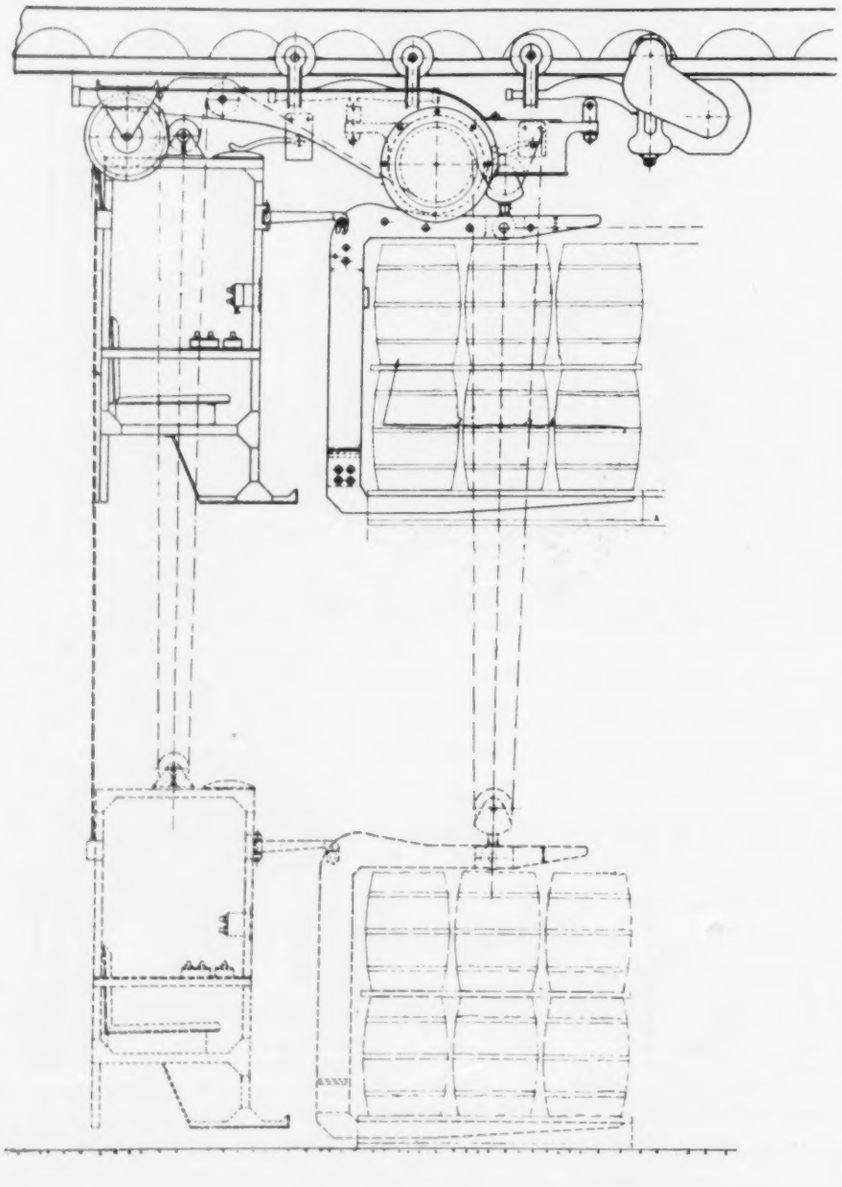
■ The accompanying illustration shows a type of materials-handling carrier developed by Cleveland Tramrail San Francisco Co., San Francisco. As seen from the diagram, its main feature is that hoist operator sits in a cab which rides up and down with the load, as well as traveling horizontally in the usual manner.

This permits operator to have direct control of piling operations of all types as the unit is suitable for use with any kind of grab in handling kegs, coils of steel sheet or wire, bundles of paper, tin plate, etc. Operator is lowered to the floor with the grab where he closely supervises operation of grab.

Then when material is being placed or stacked, operator is always at the same level as the work so that again close supervision of stacking operations is possible. This means that one man can now efficiently handle piling and storage operations with practically no limit to the piling height, as he is just as safe 60 feet above the floor as 10 feet.

Instead of requiring one man in the control cab, one man to hook on the load and a third man on top of the storage pile to unhook the material, these operations can be handled by the one operator using this equipment. In addition, the highest tier of the pile can be piled just as level and placed just as accurately as the tier resting on the floor. Possibilities in saving of floor space by permitting higher tiering and in reducing handling costs appear of considerable significance, especially in warehouses and other storage areas.

Close clearance hoist with grab and operator's cab that travels up and down with the load facilitates storage by increasing accuracy of tiering operations



Oil Well Casing Bell Formed by Die Forging

■ Announcement of the addition of a seamless bell and spigot to its line of oil field products has been made by Jones & Laughlin Steel Corp., Pittsburgh. This casing, made for welding in the well, features a die-forged bell.

This new type well casing has its bell formed by die forging instead of by the conventional expansion operation

Bell is formed by upsetting casing instead of by expansion operation. This die-forging operation is said to form a heavier bell wall, increase effective welding area and assure a concentric diameter which by its uniformity makes possible easy stabbing. This operation also provides a gentle slope or shoulder from bell to pipe wall intended to relieve internal stresses arising from expansion during welding.

A series of full section tensile tests showed that in a majority of cases the joint strength was as great as that of the pipe itself, with joint efficiency records ranging between 96 and 100 per cent. Bell and spigot casing is produced in sizes ranging from 5½ to 10¾ inches outside diameter. Steel used in the manufacture of this casing is a grade specially selected for its welding properties.

Wrinkle Finishes in All Colors Now Available

■ A new line of wrinkle finishes has been developed by Maas & Waldstein Co., Newark, N. J. Duart wrinkle enamels can be supplied in every color, including white and light pastel shades. Practically no discoloration occurs during the baking process, it is claimed.

The new finished bake hard and wear resistance with a short baking schedule. Light in body, the new product can be sprayed like synthetic enamel giving a high coverage with uniform wrinkling. Patterns can be varied from an extremely fine to a very coarse and heavy structure. One coat is all that is needed.

Markets Affected By Year-End Lull

Steelmaking Reduced; Recovery Seen for First Quarter

■ STEEL demand continues active among several important consuming industries, but the holiday and inventory periods are having a depressing effect on ingot production.

The national operating rate slipped 6 points to 52 per cent last week. Output also will be retarded this week, with January marked for recovery in both new business and production.

In view of the season, steel markets are giving a good account of themselves by showing relatively small effect of year-end influences. At Chicago, steelmaking has dropped only 3.5 points from the 1938 peak, standing at 56.5 per cent last week. Pittsburgh operations, originally scheduled at 38 per cent, moved up to 40 on better activity in some products, off only 1 point from the previous week. Detroit advanced to the year's high at 90 per cent.

Gradual recovery, rather than an immediate return to the level of operations prevailing in November, is looked for after the turn of the year. For one thing, automobile assemblies have passed the fall crest and will require less steel the early part of next quarter. The carryover of unfilled orders for flat-rolled steel will postpone resumption of heavy buying of sheets and strip until the latter part of January at the earliest.

Building Steel Activity Reaches Year's Best Rate

On the other hand, numerous building and engineering projects now getting under way will account for substantial tonnages, while railroad needs gradually are expanding. In the event the railroads receive hoped-for legislative treatment at the hands of congress, buying of track material and equipment may expand more rapidly than would be dictated by revenue alone.

Additional rail purchases lately have been confined to 50,000 tons for the Pennsylvania. New York, New Haven & Hartford is seeking court permission to buy 15,649 tons, while most other roads have yet to close on 1939 needs. Several eastern railroads are said to be preparing to order a large number of freight cars.

The sharp flurry in construction contracting, motivated largely by the PWA program, is one of the bright spots in steel markets. Structural shape and reinforcing bar inquiries and awards the past few weeks have been the most numerous of the year, and production of this tonnage will give strong support to steel operations early in 1939.

Major structural bookings last week included 7000 tons for a Jamestown, R. I. bridge, 5000 tons for a Portsmouth, N. H. bridge, 3200 tons for navy yard cranes, 1350 tons for Grand Coulee dam, 1200 tons for Socony-Vacuum Oil Co. and 1000 tons for an ordnance building, Washington. For the first section of the Chicago subway, 6800 tons of reinforcing bars, structural shapes, beam ribs and liner plates is being placed.

Automobile Output Drops; Well Ahead of 1937 Level

Automobile production dropped about 10,000 units last week to 92,890 but was far above the rate a year ago, when assemblies totaled 67,230 units. General Motors and Chrysler accounted for the decline, the former being down from 44,125 the previous week to 38,875, while the latter slipped from 27,700 to 21,960. Ford output expanded from 21,450 to 22,200, and all other makers increased from 9630 to 9855.

Steel prices have been tested lately by only relatively small tonnages but are steady. In addition, a stronger market has developed in certain products traditionally subject to price irregularity. Quotations have been established for next quarter, but there is a growing belief higher prices will be instituted before the end of that period.

Last week's steelmaking operations of 52 per cent compare with 23 per cent a year ago. In addition to declines at Pittsburgh and Chicago, reductions included 5 points to 32 per cent in eastern Pennsylvania, 11 points to 71 per cent at Birmingham, 11 points to 45 per cent at Youngstown, 3 points to 59 per cent at Wheeling and 9 points to 50 per cent at Cleveland. Unchanged districts were St. Louis at 51.5, New England at 70, Buffalo at 44 and Cincinnati at 75.

Scrap and finished steel composites are unchanged at $14.83 and $56.50, respectively.

COMPOSITE MARKET AVERAGES

	Dec. 24	Dec. 17	Dec. 10	One Month Ago Nov., 1938	Three Months Ago Sept., 1938	One Year Ago Dec., 1937	Five Years Ago Dec., 1933
Iron and Steel	$36.37	$36.38	$36.36	$36.39	$36.48	$38.88	$31.01
Finished Steel	56.50	56.50	56.50	56.68	57.20	61.70	51.10
Steelworks Scrap..	14.83	14.83	14.66	14.58	14.23	13.24	10.12

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 24, 1938	Nov. 1938	Sept. 1938	Dec. 1937
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.65
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.10	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Dec. 24, 1938	Nov. 1938	Sept. 1938	Dec. 1937
Bessemer, del. Pittsburgh	$22.34	$22.34	$21.34	$25.26
Basic, Valley	20.50	20.50	19.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	21.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	21.21	25.21
No. 2 foundry, Chicago	21.00	21.00	20.00	24.00
Southern No. 2, Birmingham	17.38	17.38	16.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	19.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.125	22.215	26.215
Malleable, Valley	21.00	21.00	20.00	24.00
Malleable, Chicago	21.00	21.00	20.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	20.17	24.17
Ferromanganese, del. Pittsburgh	97.77	97.77	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.50	$15.15	$15.25	$13.40
Heavy melt. steel, No. 2, E. Pa.	13.50	12.75	12.75	13.13
Heavy melting steel, Chicago	13.75	14.20	13.60	12.40
Rails for rolling, Chicago	17.75	17.40	17.75	14.25
Railroad steel specialties, Chicago	16.00	16.10	16.60	15.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.30
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New Cork, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras) $3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

* Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.80c

Detroit, delivered 2.90c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55

4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10

5100 0.80-1.10 Cr. 0.45

5100 Cr. spring flats 0.15

6100 bars 1.20

6100 spring flats 0.85

Cr. N., Van. 1.50

Carbon Van. 0.85

9200 spring flats 0.15

9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chgo., B'ham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller 65-5-5 off

Do. larger, to 1-in. 60-10-5 off

Do. 1⅛ and larger 60-5-5 off

Tire bolts 50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½ inch & less	65-5	70
⅝-1-inch	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10-5 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2½" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B Stnd. lengths, Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Clev., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 11/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$27.75

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.25
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.44	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	28.50

Silvery†

Jackson count, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%. $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50
Do., del. Pittsburgh 97.77

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 97.75
2% carbon 102.75 1% 112.75
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb. con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c

88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do, 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.75c
Ton lots 5.25c
Less-ton lots 5.50c
Spot ¼c higher

Zirconium Alloy, 12-15%, contr't, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	....	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	4.20	....	5.50
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars: 2300	3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.60	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Dec. 22

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$25.74 5 10 0	$17.04	2 0 0
Basic bessemer	....	16.40	1 18 6
Hematite, Phos. .03-.05	30.42 6 10 0*	.....	.....
Billets	$36.86 7 17 6	$42.60	5 0 0
Wire rods, No. 5 gage	52.77 11 5 6	43.66	5 2 6
Standard rails	$47.39 10 2 6	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	2.00c to 2.05c	5 2 6 to 5 5 0
Structural shapes	2.09c 10 0 6	1.90c	4 17 6
Plates, †¼ in. or 5 mm.	2.27c 10 17 6	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.93c	7 10 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.51c	9 0 0
Bands and strips	2.77c 13 5 0	2.05c	5 5 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	3.87c 18 10 0	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si.2.5	$25.51 5 9 0(a)	$15.73	598	$16.85	500	$25.27	63
Basic bess. pig iron	23.40 5 0 0(a)	.....	...	.....	...	27.88	(b)69.50
Furnace coke	6.44 1 7 6	5.92	225	7.25	215	7.62	19
Billets	36.86 7 17 6	22.09	840	28.98	860	38.71	96.50
Standard rails	2.12c 10 2 6	1.38c	1,150	2.06c	1,375	2.38c	132
Merchant bars	2.56c 12 4 0††	1.30c	1,080	1.65c	1,100	1.98c	110
Structural shapes	2.30c 11 0 6††	1.27c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.45c 11 14 3††	1.62c	1,350	2.06c	1,375	2.29c	127
Sheets, black	3.29c 15 15 0§	1.92c	1,600‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.87c 18 10 0	2.70c	2,250	4.13c	2,750	6.66c	370
Plain wire	4.08c 19 10 0	1.98c	1,650	2.48c	1,650	3.11c	173
Bands and strips	2.71c 12 19 0††	1.45c	1,210	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. *Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†12.00
Bos. dock No. 1 exp.	13.50-13.75
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	11.75-12.25
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.00-12.50
Chicago, No. 2 auto	11.00-11.50
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.50
Eastern Pa., No. 2	13.50
Federal, Ill.	12.00-12.50
Granite City, R. R.	12.50-13.00
Granite City, No. 2	12.00-12.50
Los Angeles, No. 1	13.50-14.00
Los Angeles, No. 2	12.50-13.00
N. Y. dock No. 1 exp.	11.50-12.00
Pitts., No. 1 (R.R.)	16.00-16.50
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.50-15.00
St. Louis, R. R.	13.00-13.50
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	14.00
Toronto, dirs. No. 1	10.00-11.00
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	11.75-12.25
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cincinnati, del.	11.00-11.50
Cleveland	13.00-13.50
Detroit	11.50-12.00
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	11.00-11.50
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	8.00- 8.50
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.50- 8.00

BUSHELING

Buffalo, No. 1	11.75-12.25
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	9.75-10.25
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	7.00- 7.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 4.75
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	4.00- 4.50
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	7.50- 8.50
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.50- 7.00
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.75- 8.25
Cincinnati, dealers	3.50- 4.00
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.50- 6.00
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.00-13.50
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.75- 8.25
Chicago	5.50- 6.00
Cincinnati, dealers	3.50- 4.00
Cleveland	7.25- 7.75
Detroit	5.50- 6.00
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.75-16.25

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	16.75-17.25
St. Louis	15.50-16.00

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.75-17.25
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	16.75-17.25
St. Louis, 2 ft. & less	15.25-15.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	16.25-16.75
St. Louis	14.00-14.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	14.00-14.50

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.50-10.00
Cincinnati, dealers	7.25- 7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	9.00- 9.50
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.50-14.00
New York	†8.50- 9.00
St. Louis	9.50-10.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.50-13.00
Toronto, No. 1 dir.	10.00

FORGE FLASHINGS

Boston district	†8.00- 8.25
Buffalo	11.75-12.25
Cleveland	11.50-12.00
Detroit	9.50-10.00
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.50-19.00

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.25-17.75
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	18.00-18.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	19.00-19.50
Eastern Pa.	21.50-22.50
St. Louis	19.00-19.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†14.75-15.00
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	16.75-17.25
St. Louis, iron	14.00-14.50
St. Louis, steel	15.50-16.00

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	12.00-12.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	13.50-14.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50-15.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	12.50-13.00
St. L., agr. mach.	14.00-14.50
St. L., No. 1 mach.	15.00-15.50
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	15.50-16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.50-12.00
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.50-14.00
New York, fdy.	†10.00-10.50
St. Louis	9.00- 9.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.00-12.50
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	16.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.00-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.50-13.00
Swedish low phos.	12.50-13.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten, sh. ton unit, duty pd. nom.	19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-31.00
So. African, 50-52% nom.	30.00-31.00
Indian, 49-50%	29.00-30.00

Sheets

Sheet Prices, Page 62

Pittsburgh — Sheet buying is in small lots. Inquiries point to a pickup in orders early next quarter, including automotive purchases. Ford is reported buying a substantial tonnage next month or late in December. Sheet production, sustained near the level prevailing the past five weeks, is expected to hold for at least another three to four weeks. Output of common and full finished material is near 70 per cent. Prices are steady.

Cleveland—New business in flat-rolled steel has experienced the usual year-end lull. Finishing mill operations have been reduced by one leading interest recently, having shipped most of the low priced tonnage booked late in October. The outlook after the first of the year offers considerable encouragement, although peak finishing operations as experienced through November and part of December are not expected to be attained until the early spring months. Renewed buying from automotive interest within the next few weeks should bolster operations considerably. Prices on all finished sheets are firm.

Chicago — Carry-over of tonnage now on books will delay resumption of sheet buying on any major scale until late in January. Some users, however, have curtailed inventories sufficiently to necessitate prompt reentry into the market. Production continues heavy but will be affected by the holidays.

New York—Producers still have substantial sheet tonnages on books, particularly cold-finished material. Some of the latter includes business placed at concessions last October. New buying is quiet.

Philadelphia — Automotive partsmakers partially are holding up shipments because of the holidays but are scheduled to resume actively in January. Stove interests are specifying freely against low-price orders. Stainless sheets are moving well through jobbers. Makers of downspouts, gutters, etc. are active. Sheet prices are firm except for some deviations noted in galvanized.

Cincinnati—Sheet buying is quieted by the season, but shipments continue heavy. Low-price tonnage is expected to be worked off books shortly. Quotations are steady on new business. The holiday will reduce schedules of some plants this week.

Buffalo — A temporary shutdown of Bethlehem Steel Co.'s new continuous strip mill at Lackawanna resulted from a fire which broke out in the motor room. The fire was confined to the oil switches and was extinguished by the company's fire-fighting force. Sheet releases continue active despite a letdown in miscellaneous demand, and most low-price tonnage has been worked off producers' books.

St. Louis—With good backlogs, sheet production is well sustained and expected to continue heavy through January. Galvanized is in brisk demand, particularly heavier gages. Specifications from stove makers are off seasonally.

Birmingham, Ala.—No slackening is evident in production of sheets, either in roofing or manufacturer sheets, with the result that mills remain on a 100 per cent basis.

Plates

Plate Prices, Page 62

Cleveland—A mild improvement in inquiries from tank, boiler and other miscellaneous users indicates a moderate pick-up in demand for plates during January. The local railroads are currently out of the market and no real improvement from this source is anticipated in the near future. Operations are generally unchanged and prices remain firm.

Chicago — Tapering of plate demand for miscellaneous fabrication has been offset partly by increased requirements for freight car building. Tanks and pipe systems in public works programs are fairly active. Plate business so far this month is off from November.

New York — Plate sellers look for a business rebound next month, but continued quiet is in prospect the remainder of December. Only a small amount of plates is actively pending, although additional shipwork is looked for shortly. Railroad inquiries are scant.

Philadelphia — Harrisburg, Pa., will take bids Dec. 27 on 2000 tons of 42-inch steel or cast pipe for a water line. A Camden shipyard is specifying plates against work under contract but still has about 16,000 tons to place for a battleship. Another nearby yard is understood to have placed contracts for several thousand tons for C-3 boats whose keels are to be laid shortly. Pennsylvania railroad is expected to place steel shortly for revamping less-carload containers. Small tank work is slow, but a few municipal jobs are appearing.

Seattle — Bids were opened at Puget Sound navy yard Dec. 21 for construction of a caisson, 27 x 147 feet, 54 feet high, tonnage unstated. Award of 850 tons for the government survey steamer EXPLORER, general contract to Lake Washington Shipyards, Seattle, is still pending. Steel Tank & Pipe Co., Portland, is low at $219,402 for furnishing 58-inch steel water pipe for Tacoma, American Concrete & Steel Pipe Co., Tacoma, low at $207,045 for concrete pipe. Award is uncertain as only $200,000 is available.

Plate Contracts Placed

300 tons, two tanks, Stamford Gas & Electric Co., Stamford, Conn., to Chicago Bridge & Iron Co., Chicago.

Plate Contracts Pending

900 tons, 58-inch welded steel or reinforced concrete pipe, Tacoma, Wash.; Steel Tank & Pipe Co. of Oregon, Portland, low on steel pipe at $219,462 and American Concrete & Steel Pipe Co., Seattle, low on concrete pipe at $207,045.

200 tons, two 500,000-gallon tanks, Montpelier, Vt., H. P. Cummings Construction Co., Boston, low.

100 tons, 1,000,000-gallon water tank, east bay municipal utility district, Oakland, Calif.; bids Dec. 28.

Bars

Bar Prices, Page 62

Pittsburgh — Automotive releases largely are supporting bar mill operations, miscellaneous demand being quieter. Inquiries from farm equipment interests as yet give little indication of the extent of buying that will develop soon in that direction. Smaller consumers have felt the seasonal trend more than has the automotive industry, this being reflected in bar orders and releases. Prices are firm, no pressure being reported on recent bookings.

Cleveland—Sellers of carbon and alloy steel bars note the usual year-end easing in demand as consumers concentrate on reducing inventories. Auto partsmakers remain fairly active, but no additional purchases from this source are expected soon. Some sellers anticipate a moderate pick-up in demand after the first of the year, particularly from agricultural implement concerns. Prices are unchanged.

Chicago—Carbon and alloy bar demand has moderated only slightly, showing strong resistance to seasonal influences until late last week. Bar sales have been outstanding in local steel markets for a number of weeks, and further gains in consumption are in prospect next quarter, except for a slowing down in automotive requirements early in the period.

New York—While bar orders are as light as at any time this year, the situation is seasonal, and bet-

ter business is anticipated for January. The immediate outlook for railroad buying is not promising, but prospects for first quarter as a whole are encouraging.

Philadelphia—Miscellaneous business is relatively quiet, and warehouses are practically out of the market pending inventory-taking. Cold-drawn and hot alloy bars tend to move better than hot-rolled carbon material.

Buffalo — With automotive demand sustained around the year's peak, bar production shows little effect of the season. Miscellaneous users have cut their requirements a trifle but not enough to affect output. One bar producer has entered the third week of capacity operations.

Birmingham, Ala. — Improvement is evident over the past few weeks in the bar market. Output, as the result, has been stepped up to something better than 60 per cent, largely on the basis of business from producers of farm machinery. Deliveries are prompt.

Pipe

Pipe Prices, Page 63

Pittsburgh — Standard pipe for building work and automotive tubing make the best showing in a relatively quiet market. A pickup in movement of standard pipe next month is indicated as a result of active construction inquiries. Pressure tubing demand is slow, while activity in line pipe is restricted to work now under way on some short lines.

Cleveland — Shipments of standard steel pipe out of jobbers' stock are seasonally lighter, and December deliveries are expected to fall behind November. Demand for cast iron pipe also is quieter. However, the January outlook in both grades offers considerable encouragement to sellers, with requirements of small municipalities, aided by federal grants, expected to play a leading role. Prices are unchanged.

Chicago—Cast pipe continues activated by PWA projects. While general contracts for such work will be placed by Jan. 1, awarding of pipe is expected to extend through next quarter. Most pipe orders are for less than 100 tons, one exception being 500 tons for Battle Creek, Mich.

New York—Steel pipe business and shipments are retarded by the strike of plumbing supply truckers, as well as by the season. Pending orders include tonnage for housing projects in this and nearby districts.

Birmingham, Ala.—Cast iron pipe interests have considerably more business, both on books and in immediate prospect, than they had a few weeks ago. Inquiry discloses that lettings definitely scheduled for the remaining few days in this month and early in 1939 probably will maintain production at the better pace evident a few weeks ago.

San Francisco—As usual at this time of the year demand for cast iron pipe has slackened and only one new inquiry of size came into the market for figures. Burbank, Calif., will open bids Dec. 27 for 118 tons of 6 and 8-inch Class 250 pipe. Lettings totaled only 160 tons, bringing the aggregate for the year to 30,820 tons, compared with 29,527 tons for the same period a year ago.

Seattle — Largest contracts pending include 500 tons of 4 to 20-inch cast iron pipe and accessories for Tacoma, Wash., bids opened Dec. 19, and 2300 tons of 16 and 20-inch for Corvallis, Oreg., bids Dec. 19. Bids for furnishing 400 tons of 2 to 10 inch for Paris, Idaho, are in but no award has been announced. Ernest Stettler, Logan, Utah, is low at $60,431.

Cast Pipe Placed

500 tons, water mains, Battle Creek, Mich., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

118 tons, 6 and 8-inch, Class 250, Burbank, Calif.; bids Dec. 27.
250 tons, Ludington, Mich.

Steel Pipe Pending

2000 tons, 42-inch steel or cast iron pipe, Harrisburg, Pa.; bids Dec. 27.

Wire

Wire Prices, Page 63

Cleveland—Demand for manufacturers' wire continues to dominate the local market, although some improvement in requirements from agricultural sources has been noted. Finishing mill operations are generally higher than in the case of sheets and strip. Prices continue firm on wire and wire rods.

Chicago — Business in wire and wire products shows definite evidence of effects of the season. January is counted on to see a reversal of the recent downward trend. Consumers' stocks are believed to be unusually light, a factor conducive to renewed buying next month. Ir the meantime, wire prices are reported firm, with only occasional minor weaknesses noted.

New York—Wire buying has slackened, although more tonnage is being booked for first quarter delivery. Eastern mills in some instances have accumulated a fair volume of advanced business, indicating finishing operations will be well maintained during the first half of the quarter. Consumption is holding, consumer inventories are not large and the outlook for the period just ahead is encouraging. Demand is well diversified and prices are firm.

Birmingham, Ala.—Wire products remain consistently in demand with the result that mills estimate current production at about 65 per cent. Some stocking on the part of jobbers and distributors is evident.

San Francisco—Bids open Jan. 12 for 1,202,000 feet of copper cable to be used for extending Bonneville dam power from Salem to Eugene, Oreg.

Rails, Cars

Track Material Prices, Page 63

Norfolk & Western will build thirty-five 70-ton cement cars in its own shops, this rounding out the distribution of 2135 freight cars within the past fortnight, 1500 hoppers, as noted at the time, being equally divided between Virginia Bridge Co., Roanoke, Va., and Bethlehem Steel Co., Bethlehem, Pa., and 500 all steel box cars going to Pressed Steel Car Co., Pittsburgh, and 100 to Ralston Steel Car Co., Columbus, O.

Magor Car Corp., Passaic, N. J., has booked thirty-nine 50-ton flat cars for the navy. It is also reported that four 50-ton steel box cars and three 60-ton narrow gage flat cars, which were up for bids at the same time, have been placed with Greenville Steel Car Co., Greenville, Pa., and Pressed Steel Car Co., Pittsburgh, respectively.

The navy, which originally inquired for bids for opening Dec. 2 on two box cars and one or two flat cars, will take new bids on this equipment Jan. 13. The war department is inquiring for 150-ton flat car for Frankford arsenal, Philadelphia. Atlantic & Western in inquiring for one 41-foot rail motor car, to be equipped with gasoline-mechanical power.

Action is pending on the application of the New York, New Haven & Hartford to the United States district court for the purchase of 15,649 tons of rails, plus fastenings.

Fredicksburg & Northern plans purchase of one freight locomotive.

Atchison, Topeka & Santa Fe directors have authorized purchase of 30 diesel-electric switching locomotives and expenditure of $3,500,000

on car and locomotive repairs in its own shops. Budget for 1939 totals $18,000,000.

Colorado Fuel & Iron Co., Denver, has been awarded 65,000 railroad tie plates for the Panama railroad at $15,990, delivered.

Car Orders Placed

Navy, thirty-nine 50-ton flat cars, to Magor Car Corp., Passaic, N. J.; four 50-ton steel box cars and three 60-ton narrow gage flat cars reported placed respectively with Greenville Steel Car Co., Greenville, Pa. and Pressed Steel Car Co., Pittsburgh.

Norfolk & Western, 600 all-steel box cars, 500 going to Pressed Steel Car Co., Pittsburgh, and 100 to Ralston Steel Car Co., Columbus, O.; also thirty-five 70-ton cement cars, to own shops.

Pullman Co., 80 light weight streamlined miscellaneous coaches to the Pullman Car Mfg. Co., Chicago, for operation (40 each) on the New York Central and Pennsylvania railroads; these include 40 noted in last week's issue as placed.

Rail Orders Placed

Illinois Central, 3500 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Pennsylvania, 50,000 tons, 131 and 152-pound; 25,000 tons to Carnegie-Illinois Steel Corp., 22,000 tons to Bethlehem Steel Co., 3000 tons to Inland Steel Co.

Car Orders Pending

Atlantic & Western, one 41-foot rail motor car, equipped with gas-mechanical drive.

Navy, two box cars and one or two flat cars, bids Jan. 13; originally up for bids Dec. 2, with the opening postponed until Dec. 9 and then again postponed.

War department, one 50-ton flat car for Frankford arsenal, Philadelphia; bids asked.

Locomotives Pending

Fredericksburg & Northern, one freight locomotive.

Rail Orders Pending

New York, New Haven & Hartford, 15,649 tons, plus fastenings; application made to United States district court for purchase.

Shapes

Structural Shape Prices, Page 62

Pittsburgh—Shape markets continue active, with substantial quantities placed and an encouraging number of new projects announced. The projects not previously reported in these columns total 10,285 tons.

Cleveland — A number of fairly large structural jobs were placed last week. Burger Iron Works was awarded an extension to Kent university, Kent, O., involving 600 tons. The same fabricator booked a state highway bridge, 190 tons, at Akron, O. The outlook offers considerable promise, with several large Cuyahoga county bridges expected to come up for bids. Fabricated prices continue weak.

Chicago — Pending business in fabricated structural steel has increased, government work being outstanding. Bridge building also continues to bolster activity. A building for Electro-Metallurgical Corp., Sheffield, Ala., will take 743 tons.

Philadelphia—A strong move is reported underway to strengthen the market on fabricated prices, where under $60 f.o.b. is not uncommon. Under this plan, mills are asking independent fabricators to buy only against specified jobs. Plan also limits the time to close construction jobs and specify steel. Considerable public work is now pending and more is in the offing.

Buffalo — There is a sufficient number of projects pending to make the outlook fairly good. Fabricators continue to report an avalanche of small jobs calling for less than 100 tons, but there are also many fair sized projects which should swell aggregate tonnage figures.

St. Louis—Bids opened Dec. 9 for Oklahoma highway bridges, and involving a substantial aggregate tonnage, have been returned, the projects postponed indefinitely. Bids have been opened for a highway bridge at Miami, Mo., with Massman Construction Co., Kansas City, Mo., low for the general contract.

Birmingham, Ala. — Fabricators remain on considerably reduced schedules, with most of the rather scattered business coming from such improvement projects as bridge and highway construction. Not a great deal of new tonnage is definitely in sight now, although there is the probability of continued small contracts to keep production reasonably steady.

San Francisco — The outstanding award went to American Bridge Co. and involved 900 tons for Sacramento River, Central Valley project, Calif. Interest centers around the outcome of the bids just opened on 6000 tons for a machine shop for the navy yard at Mare Island, Calif., on 5207 tons for the Mercer Island bridge at Seattle, Wash., on 3000 tons for an assembly shop at the naval base, Alameda, Calif. Awards aggregated 2511 tons and brought the year's total to 161,985 tons, compared with 146,819 tons in 1938. Pending business now is in excess of 50,000 tons.

Seattle—New tenders for four units of the Lake Washington pontoon bridge, involving 5207 tons, are under consideration by the State bridge authority, opened Dec. 20. Parker-Schram Co., Portland, was low bidder at $291,185 for constructing ten steel towers, 1250 tons, at Drydock No. 2, Port of Portland but all tenders were rejected as too high. The Port will relinquish its PWA grant and call for new bids, specifying treated timber. Protests were entered against steel by representatives of the timber industry.

Shape Awards Compared

	Tons
Week ended Dec. 24	35,067
Week ended Dec. 17	35,970
Week ended Dec. 10	17,175
This week, 1937	10,740
Weekly average, year, 1937	23,251
Weekly average, 1938	21,343
Weekly average, November	23,137
Total to date, 1937	1,209,072
Total to date, 1938	1,088,521

Includes awards of 100 tons or more.

Shape Contracts Placed

7000 tons, bridge, Jamestown, R. I., to Harris Structural Steel Co., New York; bids Dec. 20.

5000 tons, vertical lift span bridge, Portsmouth, N. H.-Kittery, Me., to Phoenix Bridge Co., Philadelphia.

3200 tons, hammer head cranes, New York and Norfolk, Va., navy yards, to American Bridge Co., Pittsburgh.

2200 tons, viaduct, Austin avenue and Milwaukee railroad tracks, Chicago, board of local improvements, to American Bridge Co.; through Overland Construction Co., Chicago.

1400 tons, piling, U. S. engineer, Providence, R. I., to Bethlehem Steel Co., Bethlehem, Pa.

1350 tons, drum gates and seats, contract 805, Grand Coulee dam, bureau of reclamation, Odair, Wash., awarded as follows: 600 tons to Kilbey Steel Co.; 300 tons to Stearns-Rogers Mfg. Co.; and 450 tons to John W. Beam.

1200 tons, case structures, various locations, Socony Vacuum Oil Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.

1000 tons, ordnance storehouse building, U. S. government, Washington, to Barber & Ross Co. Inc., Washington.

975 tons, bearing piles, Lake Shore drive improvement project, Cleveland, to Bethlehem Steel Co., Cleveland.

850 tons, sheet piling and H columns, Tongue Point lighthouse, Oreg., to unnamed interest.

730 tons, Lee St.-Lafayette St. Railroad station, Charleston, W. Va., to the Mount Vernon Bridge Co., Mount Vernon, O.

700 tons, third crossing of Sacramento river, Central Valley project, Calif., to American Bridge Co., Pittsburgh.

700 tons, section of Chicago subway, to Inland Steel Co., Chicago; through Herlihy Mid-Continent Co., Chicago.

600 tons, bridge, Elmira, N. Y., to American Bridge Co., Pittsburgh.

600 tons, McGilvrey hall, Kent University, Kent, O., to Burger Iron Works, Akron, O.

540 tons, roller gates, Roza diversion dam, Crownover, Wash., bureau of reclamation, to Bartlett-Hayward Co., Baltimore.

510 tons, Squirrel Hill water tank, Pittsburgh, to Hunter Steel Co., that city.

485 tons, municipal garage, Cincinnati, to L. Schreiber & Sons Co., Cincinnati.

450 tons, technical junior-senior high

school, board of education, Auburn, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.
450 tons, city hall, Hagerstown, Md., to Bethlehem Fabricators, Bethlehem, Pa.
415 tons, grade separation, Davison street and Grand Trunk railroad, Detroit, to Wisconsin Bridge Co., Milwaukee.
400 tons, dispensary building, Eightieth street and East End avenue, New York, to Harris Structural Steel Co., that city.
270 tons, Pleasant Valley bridge, Barkhamsted, Conn., to Pittsburgh-Des Moines Steel Co., Pittsburgh.
362 tons, east fork of Lewis river bridge, Clark county, Washington, to unnamed interest.
350 tons, bridges, Santa Rosa county, Florida, to Virginia Bridge Co., Roanoke, Va.
320 tons, bridge repairs, Indianapolis, Ind., to Central States Bridge and Structural Co., that city.
300 tons, commercial junior-senior high school, board of education, Auburn, N. Y., to Leach Steel Corp., Rochester, N. Y.
300 tons, state bridge over Farmington river, Barkhamstead, Conn., to Pittsburgh-Des Moines Steel Co., Pittsburgh.
265 tons, bridge, Dundy county, Nebraska, to American Bridge Co., Pittsburgh.
265 tons, Thaddeus Stevens school, board of education, Pittsburgh, to Bethlehem Steel Corp., Bethlehem, Pa.
240 tons, bridge, Dundy county, Nebraska, to St. Joseph Structural Steel Co., St. Joseph, Mo.
240 tons, power house, Alliance, Neb., to Haven Structural Steel Co., Kansas City, Mo.
225 tons, state bridge 425, New London, Wis., to Worden-Allen Co., Milwaukee.
220 tons, bar mill extension, American Rolling Mill Co., Middletown, Ohio, to International Steel Co., Evansville, Ind.
210 tons, police station and garage, Bangor, Me., to American Bridge Co., Pittsburgh.
200 tons, fourth crossing of Sacramento river, Central Valley project, Calif., to American Bridge Co., Pittsburgh.
195 tons, bridge 1468, Kanawha, W. Va., to American Bridge Co., Pittsburgh.
190 tons, bridge, Akron, O., to Burger Iron Works, Akron; through Shullo Construction Co., Akron.
184 tons, police station and municipal garage, Bangor, Me., to American Bridge Co., Pittsburgh; C. E. Burton Co., Portland, Me., general contractor.
170 tons, Jackson avenue grade school, and Hampton street grade school, Mineola, Long Island, to Reichie & Penner, New York.
170 tons, hangar, Nashville, Tenn., to Johnson City Foundry & Machine Co., Johnson City, Tenn.
160 tons, addition, diesel engine division, General Motors Corp., Detroit, to R. C. Mahon Co., that city.
150 tons, senior high school, Homestead, Pa., to American Bridge Co., Pittsburgh.
150 tons, warehouses, Green Mountain dam and Estes Park, Colorado, for department of interior, to Wisconsin Bridge & Iron Co., Milwaukee.
140 tons, garage, L. C. Cyr, Boston, to New England Structural Co., Boston.
140 tons, bridge, WPGH-M-80C, Grove Ida county, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
140 tons, business administration building Bloomington, Ind., to Insley Mfg. Co., Indianapolis.
130 tons, bridge, PWC 1211-F, Hardin county, Texas, to Mosher Steel Co.
120 tons, tower and bleachers, Duluth, Minn., to American Bridge Co., Pittsburgh.
120 tons, two bridges, Bucklin, Kan., to American Bridge Co., Pittsburgh.
120 tons, bridge, 1446, Grafton, W. Va., to American Bridge Co., Pittsburgh.
120 tons, under-crossing, Main street, Klamath Falls, Oreg., to unnamed interest.
116 tons, Shipley bridge, Clackamas county, Oreg., to unnamed interest.
115 tons, alteration, West View high school, Pittsburgh, to Levinson Steel Co., that city.
115 tons, Bonny Eagle bridge over Saco river, Buxton, Me., for state, to American Bridge Co., Pittsburgh.

Shape Contracts Pending

5207 tons, four units Lake Washington pontoon bridge and approaches; bids in at Olympia Dec. 20.
1250 tons, ten towers Port of Portland drydock; bids rejected and treated timber will be specified.
1000 tons, school, Delhi, N. Y., for board of education.
1000 tons, extension to assembly shops, naval base, San Diego, Calif., specification 8934; National Iron Works, San Diego, low.
850 tons, viaduct, Minnesota avenue, Kansas City, Kans., for state.
800 tons, pipe line, Tacoma, Wash.
743 tons, furnace building, Electro-Metallurgical Corp., Sheffield, Ala.
700 tons, south vocational school, board of education, Pittsburgh.
600 tons, housing project, Allentown, Pa.; bids in.
500 tons, hangar and headquarters building, Chicago, for state of Illinois.
480 tons, state bridge, Butler, Pa.
475 tons, court house, Trenton, N. J.; Lehigh Structural Steel Co., Allentown, Pa., low.
450 tons, hangar and headquarters building, 5340 West Sixty-third street, Chicago, Illinois Armory board.
400 tons, hospital, Nemours, Del.; bids Jan. 5.
375 tons, state hospital buildings, Middletown, Conn.
350 tons, high school, board of education, Frederick, Md.
350 tons, cell block building, Coxsackie, N. Y., for state.
300 tons, grade and high school, board of education, Margaretville, N. Y.
300 tons, procurement division, treasury department, Raleigh, N. C.; bids in.
278 tons, hangar, Oakland airport, Oakland, Calif.; bids being taken.
275 tons, state bridge, Glen, N. Y.
275 tons, field house, Utah university, Salt Lake City, Utah.
265 tons, state highway bridge RC-4010, Stamford, N. Y.
265 tons, Catholic high school, Baltimore, Md.
260 tons, state bridge FAGM 19-A, Grand Junction, Colo.
260 tons, state bridge, Shelley, Idaho.
255 tons, school, board of education, Elmira, N. Y.
250 tons, subway, item 7, State street, Chicago.
250 tons, state bridge, Norwich-Sprague, Conn.
235 tons, bridge, Grand Junction, Colo.
230 tons, state bridge, Twin Falls, Idaho.
225 tons, bridge, Shelby, Idaho.
215 tons, temporary structure over Lock Harbor for Illinois Central railroad, Gilbertsville Dam, Tennessee Valley authority; bids in.
214 tons, bridge, Corinth, Miss.
200 tons, bridge, Ruleville, Miss.
150 tons, high school addition, board of education, Aitkin, Minn.
150 tons, nurses' home and auditorium, Home for Incurable, Baltimore.
150 tons, tunnel liners, Green Mountain dam, Kremmling, Colo., for U. S. government.
150 tons, dormitory building, Michigan College of Mining and Technology, Houghton, Mich.
150 tons, armory, Millville, N. J.; bids Dec. 29.
150 tons, hangar building, Cumberland, Pa.; bids Jan. 11.
136 tons, bridge, Douglas county, Colorado; bids Dec. 29.
125 tons, state bridge 1530, West Union, W. Va.
125 tons, state bridge, New Castle county, Delaware.
125 tons, undercrossing, Adams county, Washington, bids at Olympia Jan. 4.
115 tons, alterations to round house roof, Louisville & Nashville railroad, South Louisville, Ky.
115 tons, school, board of education, Roxbury, N. Y.
105 tons, three-span I-beam bridge, Huntington, Vt.; M. DeGroot, Jericho, Vt., low, $38,038.40.
100 tons, state bridge 1534, Troy, W. Va.
100 tons, four state bridges Snohomish county, Washington; bids at Olympia, Jan. 4.
100 tons, alterations and additions, city and county building, Wilmington, Del.; bids Dec. 27.
100 tons, bridge, Ashland, Del.; Oliver Paving & Construction Co., Wilmington, Del., low.

Reinforcing

Reinforcing Bar Prices, Page 63

Pittsburgh—Jobber releases are coming in better volume than normal for late in the year. A strengthening in the market at most points is indicative of a swing to published prices early next year and is driving in tonnage which would ordinarily be held off. Prices have stiffened in most sections, with some points in the midwest and south still easy, tonnages now being placed are light, although there are numerous contracts under 100 tons which represent the initial placements on larger jobs. Lists during January are expected to be heavy and total tonnage will probably be better than any recent month.

Cleveland — Outstanding award of the week was 280 tons for a local culvert. Bids are due Dec. 27 on 500 tons for the Cleveland Veterans hospital. No award has yet been made on 415 tons of rail steel bars for the filtration plant, Sandusky, O. Fabricated prices remain weak.

Chicago—Estimating departments of concrete bar sellers are having difficulty keeping up with the large volume of inquiries. One interest reports fourth quarter bookings will exceed those of the first nine months. The unusual year-end upturn is attributed to PWA projects which must be under way by Jan. 1. While many of these already have been started, steel buying will continue for some time. Largest of recent awards is 1080 tons for a Louisville, Ky., housing development.

Philadelphia — Reinforcing bar prices are definitely stronger and while net prices are still below pub-

lished levels in some instances, the situation is decidedly improved. A fair amount of bar business is pending, including several sewage jobs.

Seattle—Pending tonnages are the heaviest in several months, the largest being the Lake Washington pontoon bridge 9043 tons, new bids opened Dec. 20 by the Washington Toll bridge authority. Other awards awaiting placement include 3200 tons for the Bonneville powerhouse. Two units of the Roza dam, Washington state, involve in excess of 1800 tons, bids involving 1263 tons being called at Yakima, Jan. 9.

San Francisco—Demand continues to hold well and more than 27,000 tons are now up for figures or pending. Awards totaled 2117 tons, bringing the year's aggregate to 153,727 tons, compared with 96,399 tons for the same period last year. Columbia Steel Co., San Francisco, took 710 tons for the United States Indian Irrigation service, Los Angeles, for delivery at Parker, Ariz.

Reinforcing Steel Awards

3800 tons, section of Chicago subway, to Inland Steel Co., Chicago; through Herlihy Mid-Continent Co., Chicago, also includes 2500 tons of liner plates and 700 tons of structurals.

1353 tons, Southern Pacific railroad relocations, Central Valley project; California, to Columbia Steel Co., San Francisco, at $67,929.23.

1080 tons, housing project, Louisville, Ky., to American Builders Supply Co., Louisville.

850 tons, invitation A-38215, bureau of reclamation, Odair, Wash., to Bethlehem Steel Co., Bethlehem, Pa.

710 tons, United States Indian Irrigation service, Los Angeles, for delivery at Parker, Ariz., to Columbia Steel Co., San Francisco.

425 tons, barracks, Fort Sill, Okla., to Sheffield Steel Corp., Kansas City.

350 tons, Huntington hospital, Pasadena, Calif., to unnamed interest.

300 tons, filtration plant, Racine, Wis., to Truscon Steel Co., Youngstown, O.; B. W. Construction Co., contractor.

280 tons, Big creek culvert in Brook Park, Cleveland, to Paterson-Leitch Co., Cleveland.

250 tons, junior education building, Indianapolis, to Truscon Steel Co., Youngstown, O.; W. C. R. Muth Construction Co., contractor.

235 tons, 250-man barracks, Fort Lewis, Wash., and Seattle bridge job, to Northwest Steel Rolling Mills, Seattle; Bailey Construction Co., Seattle, general contractor.

200 tons, University building, Iowa City, Iowa, to Truscon Steel Co., Youngstown.

190 tons, reservoir, Denver, Colo., to unnamed interest.

179 tons, business administration building, Indiana university, Bloomington, Ind., to Truscon Steel Co., Youngstown.

168 tons, crossings in Yellowstone, Roosevelt and Wheatland counties, Wyoming, to unnamed interests.

164 tons, hall of justice, Berkeley, Calif., to Gilmore Fabricators, San Francisco.

160 tons, hospital, Traverse City, Mich., to Calumet Steel Co., Chicago.

160 tons, highway work in Arapahoe and Douglas counties, Colorado, to unnamed interest.

140 tons, state hospital building, Newtown, Conn., to Concrete Steel Co., New York; E. & F. Construction Co., Bridgeport, Conn., general contractor.

136 tons, dormitory, Miami university, Oxford, O., to Pollak Steel Co., Cincinnati; through James I. Barnes Co. Springfield, O., general contractor.

122 tons, air corps technical schools, Nos. 1 and 2, Chanute Field, Rantoul, Ill., to Truscon Steel Co., Chicago.

121 tons, bridge in Yellowstone National Park, Wyo., to unnamed interest.

120 tons, library building, Virginia Military institute, Lexington, Va., to Easterby-Mumaw; J. A. Jones, Charlotte, N. C., contractor.

116 tons, school building, Dover, O., to Pollak Steel Co., Cincinnati; through Wendling Brothers, general contractors Dover.

105 tons, school, Oakdale, Calif., to Kyle & Co., Fresno, Calif.

100 tons, elementary and high school, and grandstand, Kennett Pike, near Wilmington, Del., to Taylor-Davis Inc.; Rupert & Fulenwilder, contractors.

Unstated tonnage, bureau of reclamation, Denver, to Bethlehem Steel Co., Bethlehem, Pa., $5962.27, f.o.b. Blaisdell, Ariz.; bids Nov. 29, pro. 24677-A.

Reinforcing Steel Pending

9043 tons, Lake Washington pontoon bridge; bids in to toll bridge authority, Olympia, Wash., Dec. 20.

1486 tons, quay wall, navy yard, Mare Island, Calif.; Healy-Tibbetts, San Francisco, low.

1263 tons, unit of Roza irrigation project, Washington state; bids at Yakima, Wash., Jan. 9, materials by bureau.

1120 tons, metropolitan water district, Los Angeles, specification 301; bids Dec. 28.

575 tons, reformatory, Elmira, N. Y.

500 tons, state capitol building, Olympia, Wash.; bids in.

400 tons, water tank, Sacramento, Calif.; Campbell Construction Co., Sacramento, low.

400 tons, veterans' hospital, Broadview, Cleveland.

320 tons, bridge, Spokane county, and other Washington state road projects; bids at Olympia, Jan. 4.

300 tons, sewage plant for Anderson, Ind.; T. V. Love, Akron, O., low on general contract.

247 tons, press building, University of California, Berkeley, Calif.; Dinwiddie Construction Co., San Francisco, low.

200 tons, Burroughs school, Madison, Wis.

150 tons, building, Indiana Teachers college, Terre Haute, Ind.; bids in.

104 tons, Lawton school, San Francisco; Leo Epp, San Francisco, low.

100 tons, sewage disposal plant, Ephrata, Pa.; bids in.

Concrete Bars Compared

	Tons
Week ended Dec. 24	**11,814**
Week ended Dec. 17	**11,539**
Week ended Dec. 10	**7,385**
This week, 1937	**4,939**
Weekly average, year, 1937	**6,061**
Weekly average, 1938	**6,995**
Weekly average, November	**7,556**
Total to date, 1937	**315,164**
Total to date, 1938	**356,752**

Includes awards of 100 tons or more.

Pig Iron

Pig Iron Prices, Page 64

Pittsburgh—Pig iron is quiet in new business, while only small tonnages are moving against old orders. Outlook for new purchases early next quarter is uncertain. Little change is in prospect for foundry operations next month, although better demand for railroad castings is looked for.

Cleveland—Releases on all grades of pig iron continue to lag seasonally, with the result December shipments are expected to fall behind November. Automotive foundries dominate current consumption. Moderate improvement among agricultural equipment and jobbing foundries is anticipated next quarter. Prices are unchanged.

Chicago—Foundry operations, until the holiday period, held slightly above the rate a month ago, with pig iron shipments about equal to the November volume. Sales are light, consumers showing little interest in forward coverage at the $21 market for No. 2 foundry and malleable.

New York—Pig iron sellers anticipate little improvement in domestic demand until the second half of January. Meanwhile, trading is slow and inquiry is light, except for a few scattered lots for export, ranging from 500 to 1000 tons. The latter include 1000 tons of foundry iron for China and about 1000 tons of foundry and malleable for Scandinavian destinations. Little actual tonnage has been booked for export lately.

Philadelphia — Shipments are tapering seasonally, with foundries less active. A number of plants are down for reconditioning of equipment. Some first quarter business is being placed at unchanged prices.

Buffalo—Shipments are declining in about the usual amount for this season, but sellers look for renewed activity in deliveries and buying early next quarter. Stove makers are entering their customary shutdown period after a fairly good season.

Cincinnati—Pig iron consumption and shipments have declined with the advent of the year-end. December deliveries will be well under November. Only a few new orders have been placed, following the opening of first quarter books by southern furnaces. Northern furnace books were opened previously. Hamilton Coke & Iron division of American Rolling Mill Co. is expected to light a second blast furnace Dec. 27.

St. Louis—Pig iron deliveries have recovered from a slight dip early

this month, and December shipments are expected to be the heaviest of the year. The melt is well maintained, only slight effect of the season being noted. New business is fair, although most orders are small.

Birmingham, Ala.—Blast furnace operations will continue through the holiday season, with 16 furnaces in production. Melters, while emphasizing the necessity of shipping instructions on much business now being booked, are distinctly optimistic as to prospects for continued high output during first quarter.

Scrap

Scrap Prices, Page 66

Pittsburgh—Scrap is in the year-end doldrums, with buyers showing little interest. Consumers generally are covered for the time being. Shipments against old orders have been suspended in some instances in order to minimize inventories, although scrap still is moving to down-river points within the quoted range. Prices are nominal in a number of cases.

Cleveland — The holiday lull has settled down over the iron and steel scrap trade in this area. Some shipments on orders continue to go forward. However, new business is at a minimum, although it seems clear that important consuming interests have allowed scrap reserves to run down within sight of the vanishing point. Seemingly, this insures some good buying within the next fortnight. Quotations are unchanged but are firm.

Chicago—Scrap is quiet and is expected to continue slow until after Jan. 1. Shipments against old orders are restricted. Brokers generally are paying $14 for No. 1 heavy melting steel, although the consumer market nominally remains $13.50 to $14. A few weeks ago dealer-broker trading was done at $13.50, the recent trend being indicative of the stronger undertone in the market.

Philadelphia — Export activity has subsided somewhat but offering prices hold at about $14 for No. 2 heavy melting steel, Port Richmond, and $15 for No. 1. Scrap inventories of domestic mills are down and heavier movement is seen for January. A sale of heavy breakable cast is reported at $15.50 although the same price is being paid by brokers for another point. Brokers are paying $12.50 and $13 against contracts. Blast furnace of Reading Coal & Iron Co. being dismantled by Boston Iron & Metal Co., Baltimore, is expected to yield 3700 tons, mostly No. 1 steel. New York elevated scrap, mostly wrought iron, may go to a district mill.

Buffalo — Scrap consumers are out of the market and are not interested in taking shipment against old contracts or in placing new orders before January. However, prices show no pronounced weakness despite the easier tone resulting from poor demand. Quotations largely are nominal.

Detroit—Quiet in scrap trading is explained as the usual holiday and year-end lull. Borings, busheling, bundles and turnings all are off 25 cents, and further weakness is expected when automotive lists come out this week. Purchases by steelmakers continue restricted, but renewed buying is looked for by mid-January.

Cincinnati — Seasonal dullness pervades the market despite heavy consumption by mills. Dealers are optimistic over the outlook but are inactive in trading for the present. Shipments are lighter, while prices are unchanged.

St. Louis — Scrap is inactive, with prices irregular. While new sales are lacking one large consumer, out of the market for many months, is inquiring for heavy melting steel. Deliveries against old contracts continue heavy. Heavy melting steel for delivery to Granite City is off 25 cents at $12.50 to $13.

Birmingham, Ala. — While not evident in other specifications, the scrap market seems to have absorbed some of the holiday lull, to add an even more quiet tone here. Offerings are rather scant.

Seattle — The situation shows little change, and prices are firm. Rolling mill and foundry demand is low and no new business is coming from Japan. Meanwhile shipments to the Orient continue in fair volume as credits are released. No. 1 melting is quoted generally at $14, with other grades in proportion.

Warehouse

Warehouse Prices, Page 65

Cleveland—Shipments the first three weeks this month show little change from the corresponding November period, but quieter business is expected the remainder of December. Warehouses report inventories well balanced and in line with current demand.

Philadelphia—Business is reflecting effects of the year-end, with second-half volume this month expected to be down about 50 per cent from first half. Prospects for next year are regarded encouraging.

Chicago—Sales have held up surprisingly well, volume to date being close to that of November. While a letdown is expected this week, the month will rank among the best of the year. Absence of a full seasonal recession is regarded encouraging for early 1939.

Buffalo—December sales have a good chance of equalling the November volume, despite the season. Business lately has shown little tendency to decline.

Cincinnati — Sustained demand for warehouse products, principally bars and plates, has surprised jobbers who looked for the usual year-end dullness. December volume may surpass November. Part of recent orders is attributed to small lot business diverted from mills by consumers who are attempting to hold down inventories.

St. Louis — Demand continues maintained, and although some letdown was looked for, December volume appears likely to exceed that of November. Railroad shops are taking fair tonnages.

Seattle — Volume of sales shows a gain over a month ago. Sales are in small lots but the aggregate is greater. Sheets continue in best demand. Prices are unchanged, except hot-rolled sheets which were reduced 25 cents, effective Dec. 19.

Tin Plate

Tin Plate Prices, Page 62

Tin plate production holds at about 40 per cent, with demand tending upward. Buying largely is for manufacture of general line cans and miscellaneous purposes. Heavy purchases of packers' can material is not looked for until February. Demand generally is for immediate production, and stocks are not being accumulated.

Prospects for export business are moderately favorable. Munitions programs abroad are thought likely to tie up sufficient foreign rolling capacity to stimulate the call for American plate.

Carryover of canned products into 1939 will be small compared with a year ago, while stocks of tin plate in hands of container interests also are low.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 63

Bolt, nut and rivet demand is somewhat hesitant because of the season but is better than a month ago. Specifications are aided by firmer prices. Railroad bookings are light, although 1939 prospects are brighter. Automotive and farm equipment requirements currently

make the best showing. Bolt and nut prices have strengthened with the withdrawal of some concessions granted previously.

Steel in Europe

Foreign Steel Prices, Page 65

London — (*By Cable*) — Steel and iron markets in Great Britain show seasonal quiet. Foundry and forge pig iron have been reduced 10 shillings, completing price announcements for deliveries until June 30, 1939. Lower prices have stimulated inquiries for first quarter and general sentiment is more optimistic.

The Continent reports export business quiet as the cartel has decided to make no price changes. Some revival is expected in January.

Sir John Anderson, minister for civilian defense, announced in the house of commons today that the government will place orders immediately for a large quantity of steel equipment, including private shelters for 10,000,000 people and strengthening of private basements. Cost will be close to £20,000,000, to be borne entirely by the exchequer.

Iron Ore

Iron Ore Prices, Page 66

Cleveland — Heavy gain in the consumption of Lake Superior iron ore during November, was recently reported by the Lake Superior Iron Ore association. November consumption of 3,150,073 tons, compares with 2,780,585 tons in October and also exceeds the 2,734,504 tons consumed in November last year. November also represents the first time this year that consumption exceeded the comparable month last year.

Stocks of iron ore at lower lake ports and furnaces Dec. 1 were approximately 5,170,000 tons less than on the comparable date a year ago. The Lake Superior Iron Ore association's report follows:

	Furnaces	Docks	Total
Dec. 1....	32,166,031	5,290,294	37,456,325
Month ago	33,172,565	5,421,004	38,593,569
Year ago.	36,552,692	6,073,262	42,625,954

New York — A shortage of foreign low phosphorus iron ore is developing. Sellers are booked up for the first half of 1939, and the price has been advanced from 12 cents to 12.50-13 cents, alongside docks, Atlantic ports. Sold-up condition of foreign mines is attributed chiefly to active demand from Germany the past few months. Manganese ore has declined 1 to 2 cents from its recent 32-cent market. Contracting for 1939 delivery of the latter is more active. Weakness also has ap-

ARMSTRONG'S

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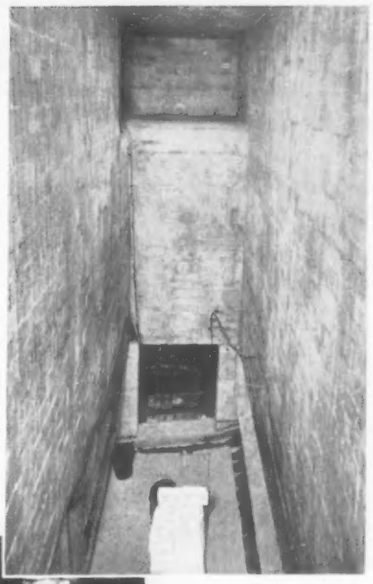
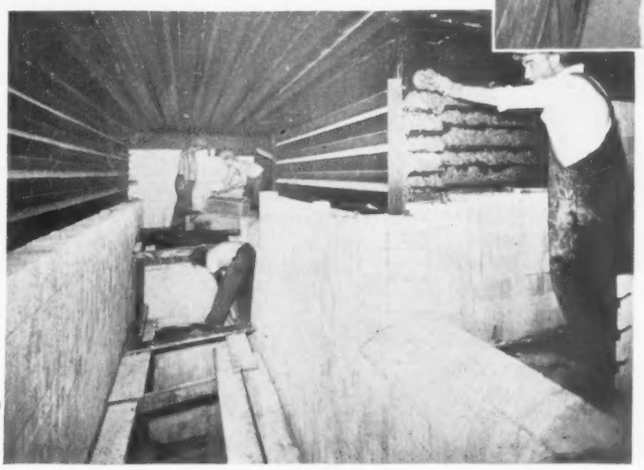
. . . aid in efficient drying of sludge in Chicago Sewage Treatment Plant





INTERIOR VIEWS *of high temperature ducts at Southwest Sewage Treatment Plant, Sanitary District of Chicago, Stickney, Ill. The up-take chambers and ducts are lined with nearly 200,000 Armstrong's EF-26 Insulating Fire Brick and Armstrong's Coprtex Heat Insulating Cement.*

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PLASTIC CEMENTS · DIATOMACEOUS EARTHS

Behind the Scenes with STEEL

Ann's First

■ We are writing this before Christmas but already the die is cast; we are once again frolicking in the holiday spirit. Of course, we're late again in getting our greeting cards in the mail, there are two more presents to fight for in the last minute rush and already the lights on the tree are going on the blink. It will be quite a weekend and by the time you have torn yourself away from hearth and home and are relaxed again in the nice quiet of your office to read this issue of STEEL, (after having thought over those January 1 bills) you too will be muttering something about "glad it only comes once a year". But it is good for us to forget our more common worries of trying to make a living and rediscover the refreshing fact that our peculiar friends, our grouchy neighbors and even our few enemies are touched with a kindly spirit. We hope, sincerely, that you have had a very merry holiday and that you enjoy a prosperous and successful New Year.

We Don't Blame Him

■ One of our circulation representatives just came back from a trip out through Iowa with a good yarn about an old gentleman he talked with in Des Moines. It seems the old fellow refused absolutely to express any interest in STEEL or any other magazine. "You see", he says, "back when I was a kid of 17 I started to read a serial story in a magazine and I had to read 118 issues before it finished. I was so goldarned mad I swore off all of 'em and I ain't read one since!"

First Pay Check

■ A pat on the back of the Steel Founders' society for coming forward on page 8 of this issue with a hard-selling program to promote and explain the use of modern steel castings. Some years ago, as a core-maker in the home town steel foundry, we mixed the distinctive odor of the molding floor with that of printers ink and we've been torn between two loves ever since.

Santa's Troubles

■ From this Xmas card received last week it looks like Santa is slated for a WPA job if things get much worse:

I'm sending this message
to tell you
That the New Deal has
taken away
All the things I really
need;
My workshop, my rein-
deers, my sleigh.

I'm making my rounds on
a donkey,
He's old, he's decrepit, he's
slow.
So, you'll know if you
don't see me Xmas
I'm out on my (ear) in
the snow.

Santa Claus

Sale's Talk

■ We're tempted to hop a fast plane for St. Louis to meet Mr. Elmer R. Sale, magazine agent, without further delay. We're afraid Mr. Sale is missing his calling. The circulation department has just passed along one of his letter heads received last week which carries this slogan right across the top: *From Failure Unto Victory, Don't Let Your Courage Fade. If Fate Hands You A Lemon, Just Make That Lemon Aid!*

Snow Joke

■ One fellow who seems to have frozen onto a job that is cut out for him is Jack Frost, superintendent of the cold mills at Acme Steel's Riverdale plant.

—SHRDLU

peared in tungsten ore prices, while chrome ore quotations are unchanged.

Baltimore—Foreign iron ore arrivals here of 167,199 tons in November brought the total for the first 11 months to 1,792,547 tons. November arrivals compared with 220,050 tons in October, which were the high point, and 134,639 tons in September.

Manganese ore arrivals totaled 38,800 tons, against 15,000 tons in October, 46,219 tons in September and 54,000 tons in January, the highest monthly figure for the year. Total shipments for the first 11 months were 403,432 tons.

Chrome ore shipments in November aggregated 6617 tons, against 7289 tons in October and 16,537 tons in April, the high point for the year. Total arrivals in the first 11 months were 107,171 tons.

Ferromanganese shipments last month totaled 1600 tons, against 200 tons in the preceding month. Pyrites arrivals aggregated 15,933 tons, as against 3000 in the preceding month. A shipment of 1000 tons of fluorspar was received and two shipments of magnesite, totaling 12,888 bags.

Semifinished

Semifinished Prices, Page 63

Pittsburgh — Activity in semifinished steel is slow, nonintegrated mills being interested in holding down inventories until after the close of the year, while demand from finishing mills is lighter. Skelp was slightly more active the past week, while movement of wire rods is fairly steady. Sheet bar production is maintained, but the previous upturn is lacking. Slight tapering in sheet demand is offset by an upturn in tin plate orders. Prices are firm.

Ferroalloys

Ferroalloy Prices, Page 64

New York—With no major price changes, ferroalloy specifications are tapering slightly, in line with receding ingot operations. A continuation of this trend is expected through the remainder of December. Meanwhile, ferromanganese and spiegeleisen prices are holding. Some minor changes are being made in packing differentials on various ferroalloys.

Steel Imports Light

Philadelphia — Imports received during the week ending December 17 included 40 tons of steel forgings, 16 tons of steel tubes, 15 tons of flat wire and 2 tons of steel bars, all from Sweden, also 25 tons of structural shapes from Belgium.

Youngstown Sheet & Tube Acquires Emsco Derrick

■ Negotiations are nearly completed for purchase of a controlling interest in Emsco Derrick & Equipment Co., Los Angeles, by Youngstown Sheet & Tube Co., Youngstown, and Republic Supply Co., Los Angeles.

E. M. Smith, president of Emsco, is reported to have sold his stock, about 55 per cent of the total, to the two interests. Emsco has built up a large oil country and miscellaneous steel supply business on the Pacific coast and in the Mid-continent oil region. Sales have been through Continental Supply Co. in the Mid-continent area and California sales have been through Republic Supply Co. The latter is not in any way connected with Republic Steel Corp., Cleveland, though a company of the same name with offices at Houston, Tex., serving oil areas in Texas, Oklahoma, Arkansas and Louisiana is one of Republic Steel's subsidiaries.

N.I.A.A. Employment Service Made Permanent

■ National Industrial Advertisers Association Inc., 100 East Ohio street, Chicago, has decided to continue permanently the free employment service undertaken experimentally last year. Companies desiring men for industrial advertising, marketing, sales promotion, research or publishing are asked by the association to use the service. Inquiries to the main office will be forwarded to the chapter in the area from which it originated. Requests from localities having no chapter will be handled direct.

Individuals seeking positions may obtain application blanks from the head office or from any chapter. An employment service committee has been appointed in each chapter to facilitate establishing contacts.

Holders of Common in U. S. Steel Decrease

■ United States Steel Corp. common stockholders of record Nov. 30 numbered 169,222, a decrease of 2483 since Aug. 26. Preferred stockholders Oct. 28 totaled 66,303, an increase of 90 since July 28.

■ Keenan Iron & Steel Co., with offices in the Keenan building, Pittsburgh, has been formed to deal in scrap iron and steel. Members of the new firm are L. H. Krieger and J. L. Singer, both of whom have had considerable experience in the Pittsburgh scrap markets. Mr. Krieger was formerly associated with David L. Wilkoff Co., Pittsburgh, while Mr. Singer was identified with M. W. Singer Co., also of Pittsburgh.

Tool Engineers Form Tri-Cities Chapter

■ American Society of Tool Engineers organized its twenty-third chapter Dec. 2 at Rock Island, Ill. It will be known as the Tri-Cities chapter and will include the industrial district about Moline, East Moline and Rock Island, Ill., and Davenport, Iowa. Charter membership numbers 55.

Otto R. Reller, Moline Tool Co., is chairman; Joseph B. Morganthall, John Deere Wagon Works, vice chairman; Kenneth C. Jasper, Rock Island arsenal, secretary; W. Z. Fidler, Reynolds Engineering Co., treasurer.

W. B. Pollock Co. Booklet Covers Its 75 Years

■ William B. Pollock Co., Youngstown, O., engineer, fabricator and erector of steel and ironmaking equipment, has issued a booklet covering the 75-year history of its contribution to advancement of the industry.

Illustrating the historical section are numerous reproductions of old photographs of officers and employes and views of the successive plants occupied as the company grew. Portraits of present officers and employes are also shown. A list of 36 employes of 20 or more years service is headed by one of 57 years.

Other features include a list of blast furnaces built by the company since its first in 1866 and illustrations of various types of equipment in its line.

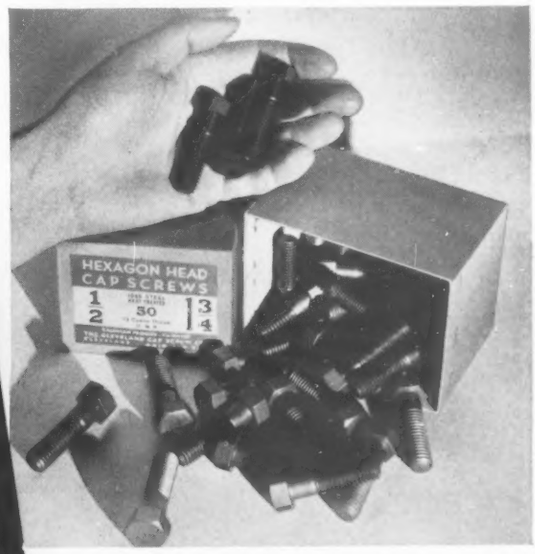
■ Factory stoker sales in October totaled 17,681, compared with 20,452 in September and 16,956 in October last year, according to the department of commerce based on reports from 112 manufacturers. Sales in the first ten months of 1938 were 83,249 units, 8 per cent less than 90,699 in the period in 1937.

Coke Oven By-Products

Coke By-Product Prices, Page 63

New York—Contract prices for phenol and naphthalene have been affirmed for a six-month period, but, as in the case of distillates, also reaffirmed for that time, spot prices

BY THE BOX OR BY THE MILLION!



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CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

are subject to change. Phenol demand is dull, the plastic trade making relatively the best showing, although far from active. Between seasons, naphthalene buying is at a standstill. Contracting for distillates continues active following reaffirming prices.

Nonferrous Metals

New York—Despite the slow, seasonal rate of new inquiry received in major nonferrous metal markets last week, price sentiment remained firm. Heavy coverage in lead was completed early in the week and was followed by a steady tapering in demand. Prices in London closed at levels equal to the highest recorded in several weeks.

Copper—The asking price for electrolytic in London remained unusually steady, holding at £50 until Friday when it moved up 5s. The open foreign market fluctuated between 10.35c and 10.45c, c.i.f. European ports on fair sales. Electrolytic held here at 11.25c, Connecticut, on light sales. Actual consumption by domestic fabricators declined 13,023 tons to 52,708 during November and a further decline is taking place this month. Consumers' working stocks declined about 10,000 tons to 175,000 while their reserves increased about 1000 tons to 317,000. Unfilled orders declined about 51,000 tons to about 192,000 which increased the amount of stocks not specified for delivery from about 69,000 tons to 84,000.

Lead—Waiting lists which were a daily feature early in the week were cleared up and new inquiry dwindled due to the pre-holiday factors. The strong price tone at 4.70c, East St. Louis, which was established Monday, was supported by the further improvement in the statistical position during November. Refined stocks declined 2240 tons to 115,236 tons, a new low since November of last year.

Zinc—Prices held unchanged at 4.50c, East St. Louis, despite dull demand. Some mining operations are being curtailed due to the unsatisfactory price level.

Tin—Buying increased steadily as tin plate makers prepare for higher operations after the first of the year. Prices moved higher with standard spot in London rising £1 10s and Straits spot in the domestic market about 25 points to 46.25c.

Antimony—Sales increased to a fair volume following a prolonged dull period. Prices held at 11.25c, New York, for American spot and nominally 14.00c, duty paid New York, for Chinese spot.

Equipment

Cleveland—Navy department has awarded the Lodge & Shipley Machinery & Tool Co., Cincinnati, a $40,670 order for lathes; Monarch Machine Tool Co., Sidney, a lathe, $6682: Cincinnati Milling Machine and Cincinnati Grinders Inc., grinding machine, $7466. A number of cranes also have been placed with Ohio firms by the navy. Eaton Mfg. Co. has purchased a plant and additional land in Massillon and announced plans to enlarge its stamping plant in Cleveland.

Tool sales to private industries eased slightly last week, due to the approaching holidays. Dealers estimate 1938 business to be 40 to 50 per cent below that of 1937, but anticipate continuation of the upward trend of the last half of 1938 through the first half of 1939.

Chicago — December bookings in machine tools have been better so far than for the same period in November. Several large lists are out at present, but it is doubtful if they will be booked before the end of the year. Some machine tool interests believe December may turn out to be the best month of the year, as demand has been surprising. Activity is lessening right now at year's end, however, and inquiries have tapered. January buying is expected to become strong about the 15th.

Washington — Navy department has awarded two 350-ton cranes for New York and Norfolk navy yards at $1,224,920, including spare parts.

Seattle — Public works projects lead, private industrial replacements being small. Bonneville administrator, 707 Failing building, Portland, has called the following bids: Jan. 5, guying material for Vancouver-Eugene line; Jan. 6, conductor, ground wire, hardware, etc., for Vancouver-Salem line; Jan. 10, 93,000 feet guy strand; Jan. 12, 1,202,000 feet copper conductor, connectors, dead end, etc., Eugene-Salem line, bid 109; Dec. 27, Spec. 108, two track laying tractors.

Same office has received bids from Allis-Chalmers, General Electric, Westinghouse and Pacific Electric Mfg. Co. for furnishing 21 circuit breakers for Eugene, Hood River, Salem, St. Johns, Oreg., Vancouver, Kelso and Raymond, Wash., award pending. Phelps-Dodge Copper Products Co. has been awarded the contract to furnish Bonneville administration 633 miles, 1500 tons, hollow copper cable, 110,000 volts.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Dec.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
17	11.25	11.37½	10.77½	46.00	46.15	4.75	4.60	4.50	20.00	11.25	35.00
19	11.25	11.37½	10.77½	46.05	46.20	4.85	4.70	4.50	20.00	11.25	35.00
20	11.25	11.37½	10.77½	45.95	46.10	4.85	4.70	4.50	20.00	11.25	35.00
21	11.25	11.37½	10.77½	46.00	46.15	4.85	4.70	4.50	20.00	11.25	35.00
22	11.25	11.37½	10.77½	46.25	46.40	4.85	4.70	4.50	20.00	11.25	35.00
23	11.25	11.37½	10.77½	46.25	46.40	4.85	4.70	4.50	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high)	17.31
Copper, hot rolled	19.37½
Lead, cut to jobbers	8.00
Zinc, 100 lb. base	9.75

Tubes

High yellow brass	20.06
Seamless copper	19.87½

Rods

High yellow brass	12.62
Copper, hot rolled	15.87½

Anodes

Copper, untrimmed	16.62½

Wire

Yellow brass (high)	17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York	6.42½-6.55
Cleveland	6.37½-6.62½
Chicago	6.12½-6.37½
St. Louis	6.00-6.25

Heavy Copper and Wire

New York, No. 1	7.75-8.00
Cleveland, No. 1	7.62½-7.87½
Chicago, No. 1	7.75-8.00
St. Louis	7.50-7.75

Composition Brass Borings

New York	5.60-5.85

Light Copper

New York	6.25-6.50
Cleveland	5.87½-6.12½
Chicago	6.12½-6.37½
St. Louis	6.00-6.25

Light Brass

Cleveland	3.25-3.50
Chicago	3.87½-4.12½
St. Louis	3.50-3.75

Lead

New York	4.00-4.25
Cleveland	3.50-3.75
Chicago	3.75-4.00
St. Louis	3.50-3.75

Zinc

New York	2.50-2.62½
Cleveland	2.00-2.25
St. Louis	2.25-2.50

Aluminum

Borings, Cleveland	6.25-6.50
Mixed, cast, Cleveland	7.75-8.00
Clips, soft, Cleveland	13.25-13.50
Mixed cast, St. Louis	7.00-7.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	11.00
Standard No. 12 aluminum	13.50-14.00

Construction and Enterprise

Ohio

AMHERST, O. — Village, Clarence E. Cooper, mayor, is preparing plans and will hold referendum Feb. 14 on construction of a municipal light and power plant costing $145,000, including diesel-driven electric generators. Floyd G. Browne, Marion, O., consulting engineer. (Noted Oct. 31.)

BELLEFONTAINE, O. — City, John Thatcher, service director, is taking bids due at noon, Jan. 6, on sewage disposal plant expansion costing $200,000. Project includes primary tanks, sludge digestors, trickling filters and other equipment. Floyd Browne, Marion, O., engineer. (Noted Oct. 10.)

CARROLLTON, O. — Carroll Electric Co-operative Inc., Hosterman building, has REA allotment and is preparing plans for construction of 182 miles of rural power lines in four counties at cost of $194,000. Consulting engineers, Biggs & Hill, New York.

CLEVELAND — Addressograph-Multigraph Co. has awarded contract to H. K. Ferguson Co., Cleveland, for design and construction of addition to its plant at Euclid, O. Plans provide for one-story brick and steel unit, 132,000 square feet, costing about $1,000,000 with equipment.

DAYTON, O. — Army air corps, materiel division, contracting officer, Wright field, takes bids to 10 a.m., Jan. 5, on hydraulic sheet metal forming press of 220 tons capacity, hydraulic arbor press of 35 tons capacity, and a hydraulic arbor press of 75 tons capacity.

MARION, O. — City has WPA allotment of $22,493 for projected improvements to its sewerage and water systems and plans to begin work immediately.

NILES, O. — City, W. P. Kearney, mayor, has rejected bids on Contract 2 and will soon take new bids on equipment for underground electric system costing $109,569. Will require cables, transformers, switches and conduits. Consultant, A. H. Heindenreich, Hudson, O. (Noted Oct. 31.)

TROY, O. — City, J. D. Boak, mayor, has rejected first bids and will soon readvertise on construction of projected sewage disposal plant and sewage system to cost an estimated $132,000. George B. Gascoigne & Associates, Cleveland, consultants. (Noted Dec. 5.)

WALBRIDGE, O. — Village, Edward Cavanaugh, clerk, is preparing plans on project to mature about Feb. 1 for construction of sewers, sewage plant and pumping station to cost approximately $96,000. Consulting engineer, H. P. Jones & Co., Toledo, O.

WELLSTON, O. — City, J. L. Steel, mayor, has been allotted PWA grant and is taking bids due Dec. 30 on construction of a six-part project involving a new electric light plant and distributing system at cost of $200,000. Consulting engineer, F. W. C. Bailey, Columbus, O.

WOOSTER, O.—City, G. F. Allspaugh, service director, contemplates construction of water and sewage lines with purchase of appurtenant equipment. J. E. Fox, city engineer.

Massachusetts

AMHERST, MASS. — City, sewer commission, takes bids due Jan. 6 on Contract No. 4 in construction of a $70,000 sewage treatment plant. F. A. Barbour, Boston, engineer.

NEEDHAM, MASS. — City, R. C. Hall, chairman of selectmen, has rejected preliminary bids and announces it will accept new bids on installing equipment for sewerage pumping station. F. A. Barbour, Boston, consulting engineer.

NEWTON, MASS. — G & S Paper Co., 93 West street, is taking bids on construction of a proposed one-story brick, steel and concrete warehouse costing more than $50,000. C. S. J. White, Newton, architect.

New Hampshire

CLAREMONT, N. H. — City, board of selectmen, takes bids due Jan. 5 on Contract No. 2 in construction of intercepting sewers costing $94,000 and on Contract No. 3 in construction of sewage treatment works costing $90,000. T. F. Bowe, New York, consulting engineer.

New York

JAMESTOWN, N. Y. — Hope's Windows Inc. has let general contract at $64,985 to Haas Construction Co., 1001 Monroe street, for construction of a factory.

JAMESTOWN, N. Y. — Clark Hardware Co. Inc. takes bids on construction of a two-story, 100 x 100-foot brick and steel warehouse costing an estimated $40,000. Beck & Tinkham, Bailey building, Jamestown, engineers and architects.

NEW YORK — Affiliated Machine & Tool Co. Inc. has been organized with capital of $20,000 to manufacture tools and machinery. Bregman & Slow, 50 Court street, Brooklyn, representatives.

NEW YORK — F. M. Schildwachter & Sons have let a $40,000 contract to G. Hoffman, Washington avenue, for construction of a one-story ice plant.

PERRYSBURG, N. Y. — Memorial hospital, T. J. Mungovan, chairman of hospital commission, will repair and improve institution's sewage disposal and power plants at cost of $25,000.

New Jersey

LAKELAND, N. J. — Camden county board of freeholders, Camden, N. J., rejected first bids and will soon readvertise for bids on construction of electric power plant at mental hospital here. Cost about $390,000. Perring & Remington Co., Camden, engineer. (Noted Oct. 10.)

Pennsylvania

NEW CASTLE, PA. — Pennsylvania Power Co., Youngstown, plans to begin soon on construction of a new power plant and extensions in its transmitting lines and distribution system, including new power substations.

TORRANCE, PA. — State plans to build a sewage disposal plant and water reservoir at grounds of Torrance institution. A. S. Janeway, 112 North Twelfth street, Harrisburg, Pa., executive director in charge. Cost estimated at $306,000. Chester Engineers, Pittsburgh, consulting engineers in work.

Indiana

COLUMBIA CITY, IND. — Whiteley County Rural Electric Membership Corp., Homer Ummel, superintendent, is taking bids for an unstated time on construction of 88 miles of rural electric lines in two counties at cost of about $55,000. Indiana Statewide R. E. M. Co., Indianapolis, consulting engineer. (Noted Dec. 12.)

GARY, IND. — City, R. E. Rowley, president of board of sanitary commissioners, takes bids due Dec. 30 on contract No. 1, division C, of $3,000,000 project to rehabilitate Miller sewage treatment plant. C. Cole Engineering Co., South Bend, Ind., consulting engineer.

Alabama

CULLMAN, ALA. — Cullman County Electric Membership Corp., H. W. Flake, superintendent, will receive bids soon on construction of 39 miles of rural power transmission lines in two counties. REA has approved allotment.

TROY, ALA. — South Alabama Elec-

THE HANNA FURNACE CORPORATION

MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION

Buffalo Detroit New York Philadelphia Boston

tric Membership Corp. has been allotted $239,000 by REA in the projected construction of 265 miles of rural power lines.

Kentucky

MAYFIELD, KY. — REA has allotted $219,000 to West Kentucky Rural Electric Co-operative to finance construction of 198 miles of rural electric lines in four counties.

North Carolina

KERR, N. C. — Four-County Electric Membership Corp. has REA allotment of $76,000 and plans to build 64 miles of rural power transmission lines in the respective four counties.

SHELBY, N. C. — City, Harry Woodson, mayor, plans to make improvements in its water and sewer systems and has been allotted $56,000 by WPA.

South Carolina

EASLEY, S. C. — City has voted $40,000 bond issue to supplement $55,000 WPA grant in the construction of a proposed sewer system project.

Tennessee

CHATTANOOGA, TENN. — Electric Power board, S. R. Finley, chief engineer, receives bids Jan. 3 for Contract No. 3-D on regulating transformers costing $38,000.

JEFFERSON CITY, TENN. — City, Ben S. Catlett, mayor, receives bids Dec. 27 for construction of disposal plant and sewage system for which $81,000 is estimated to be available. Consulting engineer, Campbell Wallace, Knoxville, Tenn.

MEMPHIS, TENN. — Memphis light and water division receives bids Dec. 29 for contract No. 65 on underground substation lines costing $95,000; and on Jan. 5 for contract No. 27-A for overhead distribution system costing an estimated $310,200.

PORTLAND, TENN. — City is receiving bids for contract No. 1 in project for construction of distribution system costing $28,350. Thomas H. Allen, Memphis, consulting engineer.

Missouri

ELLSINORE, MO. — Ozark Border Electrification Co-operative, P. G. Wingo, president, takes bids to 11 a.m., Jan. 4, on proposed construction of about 253 miles of rural electric lines to cost an estimated $200,000. E. T. Archer & Co., Kansas City, Mo., engineers.

FAIRPLAY, MO. — City has received PWA grant and will soon take bids on construction of a waterworks plant and water distribution system at cost of $32,000. R. Sweeny, Springfield, Mo., consultant.

MACON, MO. — Macon Electric Co-operative has been granted $231,000 REA allotment for construction of 228 miles of rural transmission lines in four counties.

Arkansas

OZARK, ARK. — Arkansas Valley co-operative has been allotted $170,000 by REA for constructing 295 miles of rural lines in five counties.

PIGGOTT, ARK. — Clay County Electric Co-operative has received REA allotment of $300,000 for construction of 270 miles of rural electric power lines in three counties.

TEXARKANA, ARK. — Southwest Arkansas Co-operative Corp. has $267,000 REA allotment for building rural power lines in seven counties.

Oklahoma

COYLE, OKLA. — City plans to construct a sanitary sewerage system and sewage disposal plant at cost of $30,000 on which WPA has allotted a grant. Alexander & Pollard, Oklahoma City, Okla., consulting engineers.

Minnesota

ALBERT LEA, MINN. — City, Olaf Lee, clerk, has awarded contract to Chicago Bridge & Iron Co., Chicago, for $94,350 in construction of a 1,000,000-gallon elevated steel water storage tank and tower with appurtenant equipment.

BAGLEY, MINN. — PWA has approved grant to the village, G. B. Courtney, recorder, to aid financing of project to construct sewage disposal plant and sewerage system costing $100,000. Druar & Milinowski, St. Paul, consulting engineers. (Noted Oct. 24.)

CHASKA, MINN.—City, F. W. Spiettstoesser, clerk, has been allotted a PWA grant to aid financing of project for construction of sewage treatment plant and sewers to cost $123,000. Druar & Milinowski, St. Paul, consulting engineers.

KENSINGTON, MINN. — Village, A. L. Osterberg, clerk, takes bids to 7:30 p.m., Jan. 3, on construction of a tank and tower, pump house with turbine pump and meter, and water mains. Funds available total $28,155. Certified check 10 per cent to accompany bid. Ealy C. Briggs, St. Paul, consulting engineer.

LITCHFIELD, MINN. — Voters at recent election approved $65,000 bonds to finance construction of a sewage disposal plant. William Martinson, clerk.

NEW ULM, MINN. — City, A. C. Sannwald, clerk, has received PWA grant in the projected construction of a sewage disposal plant costing $224,307. Ralph D. Thomas & Associates, Minneapolis, consulting engineers. (Noted Oct. 24.)

WAZATA, MINN. — PWA has allotted grant to village, C. L. Johnson, clerk, in the construction of a sewage disposal plant costing about $200,000 for which voters have approved bond issue. Druar & Milinowski, St. Paul, engineers. (Noted Dec. 5.)

Texas

BIG SPRINGS, TEX. — City, R. V. Jones, mayor, is receiving bids on construction of water mains, dams, diversion channel, pumping station, filtration plant and concrete storage reservoir. Frees & Nichols, Ft. Worth, Tex., consulting engineers. (Noted Oct. 17.)

GALVESTON, TEX. — City has PWA grant on construction of proposed booster pumping plant estimated to cost a total of $55,000.

GREENVILLE, TEX. — Farmers Electric Co-operative Inc. has been granted $215,000 REA allotment for constructing 221 miles of rural power transmitting lines through nine counties.

MARBLE FALLS, TEX. — City, I. B. Matern, mayor, is taking bids on construction of electric distribution system estimated to cost $32,727. J. W. Beretta Engineers Inc., San Antonio, Tex., consulting engineer. (Noted Dec. 12.)

RUSK, TEX. — Cherokee County Electric Co-operative has been allotted $276,000 by REA to enable construction of 340 miles of lines in three counties.

Kansas

DESOTO, KANS. — City, F. L. Stuchbery, clerk, is taking bids until 7 p.m., Dec. 30, on construction of a water treatment plant. Shockley Engineering Co., Kansas City, Mo., consulting engineer.

Nebraska

SYRACUSE, NEBR. — Eastern Nebraska Public Power district, F. A. Martz, superintendent, will accept bids shortly on construction of 803 miles of electric lines costing about $871,000.

Iowa

COGGON, IOWA — City, John DeWoody, clerk, is receiving bids to 7 p.m., Jan. 9, on installation of a 200-horsepower diesel engine and repair of present 120-horsepower engine.

CRESCO, IOWA — REA has allotted $206,000 to Howard County Rural Electrification co-operative, William Shea, president, in the prospective construction of 181 miles of rural power transmission lines in two counties.

GLIDDEN, IOWA — REA has allotted $147,000 to Glidden Rural Electrification Co-operative, Thomas Connor, superintendent, to finance construction of proposed rural lines totaling 124 miles in three counties. Young & Stanley, Muscatine, Iowa, consulting engineers.

HARLAN, IOWA — City, Leo Billings, secretary, board of trustees, takes bids to 7:30 p.m., Jan. 19, on installation of a 2000-horsepower diesel engine, exciter and generator. Certified check $2000 to accompany bid.

INDEPENDENCE, IOWA — Buchanan County Rural Electrification co-operative, Norman Frye, president, has received $293,000 REA allotment in the construction of 271 miles of rural distribution lines in five counties.

MANNING, IOWA — Village, O. V. Schelldorff, clerk, takes bids to 7 p.m., Jan. 11, on construction of a reservoir, pumping equipment, chlorinator and electric controls. Certified check 5 per cent to accompany bid. Young & Stanley, Muscatine, Iowa, engineer.

OKOBOJI, IOWA — City, M. S. Elston, clerk, approved $22,000 in bonds to aid financing construction of waterworks plant.

Pacific Coast

LOS ANGELES — Department of water and power, 207 South Broadway, E. F. Scattergood, engineer, is drawing preliminary plans for construction of a line to transmit power from Boulder dam. Cost estimated at $5,000,000.

LOS ANGELES — Metropolitan water district, 306 West Third street, F. E. Weymouth, engineer, rejected first bids and will readvertise on construction of reservoir to cost $500,000 with equipment.

SPOKANE — Washington Water Power Co., J. E. Royer, general manager, plans to spend $131,000 for new plant equipment and $71,000 for additions to substations and transmitting lines during 1939.

SPOKANE — Alder Group Mining & Smelting Co., 420 Realty building, has been incorporated with $30,000 capital by Karl H. Blaesser and associates.

Canada

ALDERSHOT, ONT. — Scott Distributing Co-operative Co. Ltd., R. L. Scott, president, plans to build a two-story, 60 x 116-foot cold storage plant costing $70,000. E. H. Darling, Hamilton, Ont., engineer.

CHATHAM, ONT. — Chrysler Corp. of Canada, 300 Tecumseh road, Windsor, Ont., plans to construct a parts manufacturing plant to cost about $150,000.

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EXACTLY what do we mean by the term "business"? Try to explain fully and completely just what business is, and you will discover that you are explaining the outstanding facts of American life. In explaining business, you go a long way toward explaining what made this country the best place in the world to live in.

We in the United States are only 7 per cent of the world's people. We own half of all the wealth in the world. We have 71 per cent of the world's automobiles, 52 per cent of its telephones and 40 per cent of its radios. How did all this come about?

Why is the standard of living in America higher than anywhere else? Why are we so well off that we consume one-fourth of all the sugar produced in the world, one-fourth of the coffee, and three-fourths of the silk? Why do we use one-half of the world's production of coal, and one-half of all the electric power? All for a mere 7 per cent of the world's population!

If you provide a complete answer to all these questions, you will also have given a good answer to the question "what is business," for it is through the workings of business that America has won economic leadership. Without our highly developed business mechanisms, 45,000,000 willing workers could never have produced our unparalleled standard of living, not even if all the earth's riches were beneath our soil and if all our farm land were the most fertile in the world.

Collectively, business is merely the production and exchange of commodities. Individually, businesses in this country are a million separate enterprises, producing, selling, and transporting things, and financing the flow of trade. Business men are the people who make a living by conducting these million separate enterprises and who take the risks of owning them. From the corner grocery to the big steel company, each independent unit in our business system is working hard for that success which can be gained only by serving and satisfying its customers.

Business is good when these one million separate businesses are busily making and exchanging their products. They do this when costs and prices are in proper balance, and when the existing purchasing power is actively being used by consumers and by industries in buying from one another.

Businesses stimulate buying activity by offering better merchandise and more attractive values, and by advertising them widely. This is the way all new industries have been built. It is the way business operates normally in building prosperity.

Whatever else may have helped, the American spirit of business enterprise has been the mainspring of our progress, aided at every point by the use of good advertising in distributing the products of industry. The high standard of life in America is an achievement of business, and it is not the nature of business to be satisfied with past performances. The imagination is challenged by goals of the future.

*PREPARED BY THE BUREAU OF RESEARCH AND EDUCATION, ADVERTISING FEDERATION OF AMERICA

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